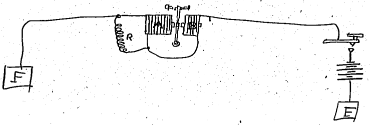
Undated. Telegraph (NS-Undated-005)

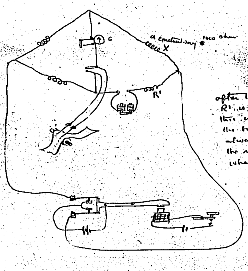


Reversals will work it stronger

A and B are both in the same circuit & when R is on A. both pull the armature in opposite direction with equal strength, supposing the line closed & the lever to the right at the moment of opening B will lose its magnetism immediately whereas the current from A circulating within the shunt will cause its cores to retain their magnetism for ~~same~~ an instant & this magnetism draws the lever to A. where it remains if the circuit is closed B instantly obtains its magnetism while the self induced current from A circulating within the shunt retards its magnetizing time hence the lever is attracted by B. A & B may be the same length, but greater margin is obtained when B is shorter than A.

In using the iron recording points smooth the ends every few minutes with a smooth Swiss file, otherwise they will scratch the paper = the oxidation causes the points to become rough = also try to get both the points to have the same pressure = if the pressure is unequal one current will appear stronger than the other = The filing will also keep the points even with each other = do not use the paper when too moist as the record will not be sharp = The straighter you can set the pens the better

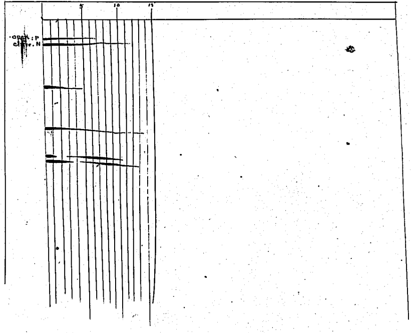
To test a magnet always in a circuit of the same resistance with same current.



after the insertion of the magnet R' is to be adjusted to a balance this will make the resistance of the branch containing the magnet always the same independent of the resistance of the magnet when that is below the resistance of X.

The discharge & charge currents from Electromagnet are much greater with reversed currents than with straight currents and in testing it is best to use the reversed current. =

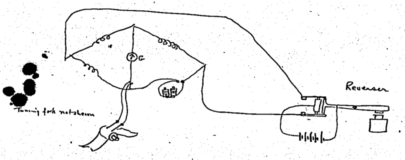
The tuning fork may be adjusted to any rate, perhaps 100 per second would be the best. with a high rate of vibration the dots may be rather close together if you desire to record the induction from the magnet slowly. hence you may include in the same circuit with the 100 fork a 50 fork and allow the 100 to break for it placing the contacts for the chemical paper on the 50 fork = A Wheatstone, Caselli ~~Clockwork~~ should be arranged to feed the chemical paper as the strips are more convenient for comparison although it may be run irregularly & at any speed as the Tuning-fork dots is the measuring rule =



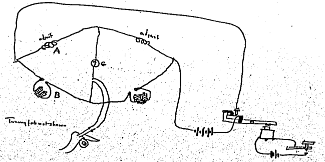
The column might be the timing for dots and if you use rolls of preliminary paper it will be necessary to immediately record in table ~~the~~ similar to this -

At the same time the swing of the galvanometer needle may be taken providing the chemical paper is plugged out of the bridge - This might serve to correct the chemical test but I dont believe it amounts much -

If it is desired to use reversed current which [illegible] out the self induction more strongly Connect thus


G
Reverser
Tuning fork not shown

To obtain the difference in the induction of one magnet over the other by balancing one against the other, Connect thus


adjust
A
adjust
G
B
Tuning fork not shown

To double discharge or rather increase it

Place B at A & A at B.

Shunt

Curr Curr

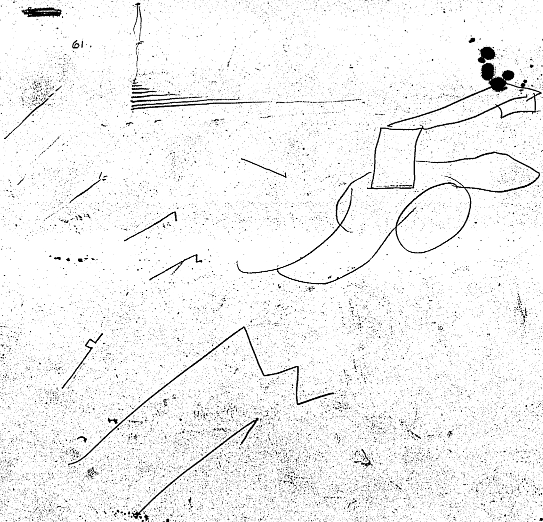
curr

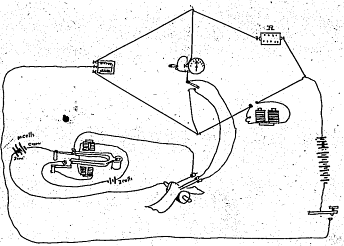
Capron

See see hit

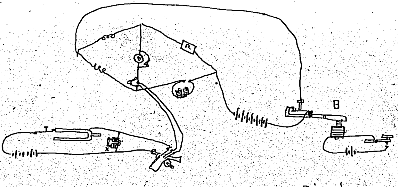
hit

61.





Connections for testing self induction of magnets =

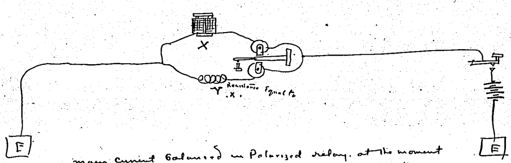


X is a 10 to 20 ohm magnet with cores so as to cause tuning fork vibrations to be sharp & clear which it brings about by its self induction

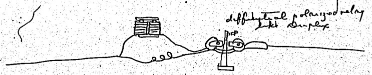
B is used so as to get a regular stroke and because it has a spring contact which prevents a source of error due to rebound of key lever when striking a rigid point =

In place of the magnet polarization batteries (i.e.) secondary
batteries may be inserted = Even the polarization of
batteries may be tested if a Leclanche battery is
inserted in place of the magnet and a Daniel or
Callaud inserted in the other side and sufficient
number of Elements used they can be balanced, reversals
of the outside battery, will give the polarization the same as induction, #

methods of working by the self induction of magnet.

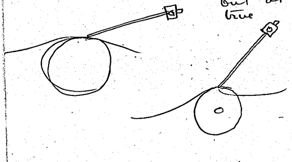

X
Y
Resistance Equal to .X.
E
E

main current balanced in Polarized relay. at the moment
of opening & closing the inductive currents from X ~~thro~~
Circulating with the circuit formed by X Y & the relay
throw. the Tongue over


differential polarized relay
like Duplex
stop

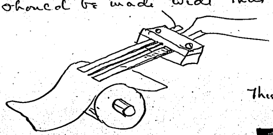
If at this angle the record will not be a true one

But at this angle is will be nearly true

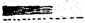


If you want to use a tuning fork with more than 100 vibrations per second - the central point should be a little finer & set as near perpendicular as it will work & do not cause too much pressure to be put on it =

If you wish to ascertain by coloration the relative strength as well as discharging & charge times the recording points should be made wide thus



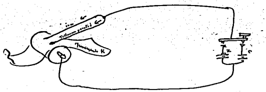
This will record thus:



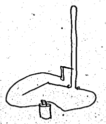
If it is desired to obtain a recording point which will record to either the closing or the opening change tip an~~p~~ iron wire with Tellurium and file off the bottom so as to expose ~~[illegible]~~ the iron ~~[illegible]~~ the passage of ~~a p~~ copper current

when the ferridcyanide Paper is used will oxidize the iron point form protoxide of iron & this will Combine with the Ferridcyanide of Potassium To form Turnbulls Blue if a Zinc Current passes down the point Hydrogen is Evolved and the Combining with the Tellurium forms Hydrotelluric Acid or Telluretted Hydrogen which is instantly decomposed on contact with the air leaving a Brown mark =
Thus we have a single point which records independent of the direction of the Current =

Another method is thus but double points are used



if c to line iron records
if z to line Tellurium "



X.1

W Minute

~~[illegible]~~,

Wy ~~It~~ as near as I can make out the main battery is taken off too quick main battery roller should be exactly square with ~~the~~ line through the secondary wire of coil & the local roll

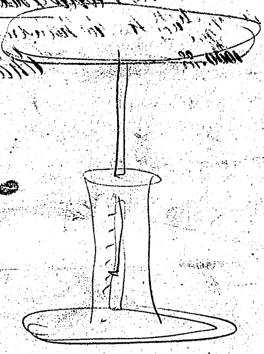
My U say the main battery roller should be exactly even with secondary roller —

W ~~My~~ Yes, main battery & secondary are exactly on line & the local about 2/3 of its diameter

My I understand wait a min

My Try it now

W ~~[illegible]~~ minute



X. 3,

Wy ready for faster,
W yes, how fast,
Wy about 700,
now —
ga ——

32705
10105
22600

W its beautiful dakers & the
boys are in Estacy

Wy ~~Yes~~ Ha Ha
I shall I give it to you fast

W Yes like devil
Now ga
Brrr

Wy min
It is splend · but didn turn it fast nuff
W if you have our speed make a whole
it & send slip. W go at same speed
min
now ga
nur
Brrr

X 4

min ~~sample~~

W. Thats real good

Suppose u give me abt 500 rods min

W That was at rate of ~~[illegible]~~ 500 a min

~~by~~ Counting rods fr

Very good Clean cut

OK

Dickens says its best ever saw

My want me go faster

W yes & give 500 rods a min

My you ready

go

W= Dickens say its the best as we have taken yet

send it to me marked by mail

Now go

Now

Brrr

well I shouldnt think 500 rods a min

want it more

My who also want 1000, Ill turn very fast

a Min

W Now go

Brrr

My ~~[illegible]~~ Hows ~~that~~

My Hows ~~[illegible]~~ ~~that~~

W ~~I~~ Whats mtr ~~[illegible]~~

got the first of it then ×5— were opened X 5—

B
my got both from you got ~~[illegible]~~

U want it again

Yes as soon as paper ready.

~~want~~

~~say now~~

At this point we stopped fooling with them — at no time did they go higher than 330 words per minute which they called 1000, They used roller pens, and changed them morning pen very after,

~~Now Pack [illegible] 15 or~~

Now Brm

925 PM

ny I got em

Wash I'll try it & see if you

~~as~~ " got em. ..

Now Brrrrrr

now heres something faster

Wash Auto Brrrrr

ny min

mple 1, 105 wds min

very well ga

W. I G.

Now

ny ga Brrrrrrr ~~ta~~

Sample 2, 150 wds per min

ny ~~ny~~ min

ny IT was not as good as usual

Try again same speed

Wash Now ?

ny ga Brrrrrrr

W ~~ay~~ hows that ? whats matter —

NY thats what I want to know

ga ahead slower this time

Brrrrr

ny min

Sample 3, 75 wds per min

NY = Min Paper
Wash R is ready
NY Try it abt 1000, wds min
W now
——— Brrrr
NY Min
" Badly tailed
9 38 Pm Sample 4 — 150 w[illegible]
Y Try it with L[illegible]
It wont Com bet[illegible] would to set
a roller first
" Ready It
W Go on ~~7s~~ 7
NY Go now
Brrrr
My Min
Sample 5. (155 wds min)
NY Thats great deal better Min
I will fix my pen a little I think
it will help it. W: yes you might fix it a little
~~pretty soon~~. How fast was it
W It was fast as hell

~~[illegible]~~

W you ready
W ga wn Nw
pretty fast ~~ga [illegible]~~ mi
now ga 500 wds min
Now

Brrrrrr
Sample 6 (105 wds Min)
That came beautiful. My pen
wked better
~~say~~ Withdraw Paper off one Roll
want some more
do you want some more
got Tribune man here
ga 6 to 800
ga won
Nw Brrrrr
Sample 7 (155 Min)
Ny It Came elegantly
Ny now want u send fast
W—now faster ga won
The local is very poor
W. I think the great trouble
is M. I dont get any spark
hardly. do u want it renewed
to nite it will take 15 min
Ny yes but not now ga
1000 wds min ga now
Brrrr
Sample 8

How is it

Lacked [illegible]

am Running the Local & Quick C if it dont Cash
it Close not Connect it up
am doing it now dont y the
we leave off we better buy
all [illegible]

+ [illegible]

~~Yr Will [illegible]~~

198

how long did you see Rap
today? only few minutes,
He came in to make app't for
tomorrow at 830 oclock AM
and he would like see auto
work told him a had
try it tomorrow night & he
could see it He returns
tomorrow night he
says we will have Andy
was in to proceedings
today, U say U was
there, no
yes he went on for any
purpose -
OK go I will ~~tonight~~ you
~~Tomorrow~~ whether try tomorrow
please send me some Chase fast
specimens, yes I will
with tomorrow I send plo let me
know in am what time you try

If you do I shall have
machine fixed here in
morning first thing, you
mean that crazy insulation

Yes it's very strange —

The insulation's
imperfect I see
[illegible]

quite
Hard [illegible] P4.4 order
put in Ivory that is what
I shall,

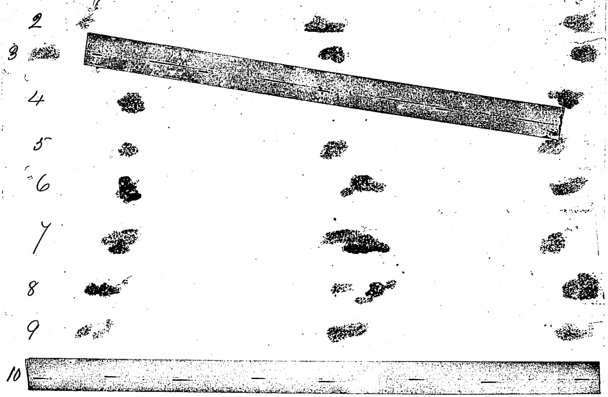
where you think trouble
is at bending part —

Yes & also in the middle
standard which holds drums —

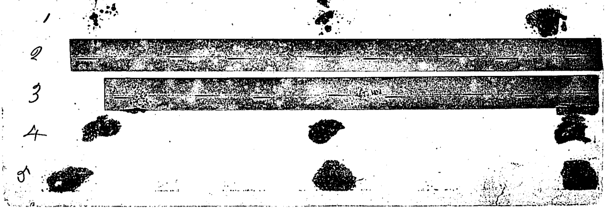
Let you know as soon as P+G
get inst fixed I dont want
~~nt~~ to contend with an trial

I think ahr them it will be
well to say tha ot
use any such ms
as these I wil
sketch tomor
feel pleas
Yes but little disappointed
that this shouldnt work
faster we know it has
done such very fast work
that it seems funny it sh
be so stiff tonight. I
is owing to this shunt, is to
I think more of it is due to
the very bad escape in the
wire which is induced current
off you have no battery there &
dont realize it Its very hard
to adjust for you leaks so bad

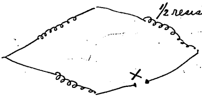
and by moving the cores a little further away each time we got the following in succession —



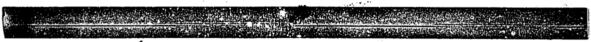
We now shunted the 150 Ohm relay with a condenser of 3.2 Micro Farads capacity & took the following :-



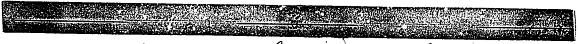
With the 1600 Ohm relay at X and ½ resistance in opposite side thus .


½ resistance magnet
X

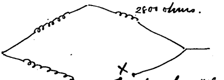
and the cores touching & with condenser 3.2 MF round magnet we get this :-



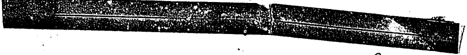
and without condenser this



We now put double the number of ohms opposite the magnet thus

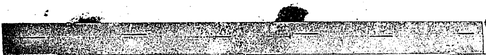

2801 ohms.
X
1600 ohm relay

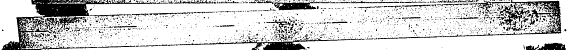
& got this without condenser.



with condenser round magnet we got this :-

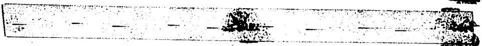
With a 1600 ohm relay at X we got the following:—

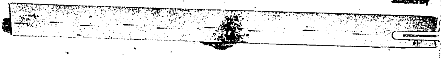
1


2


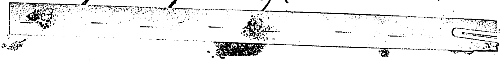
3

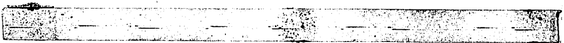
4

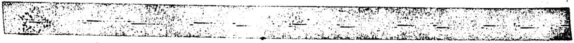
5


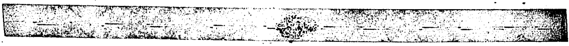
6


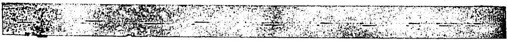
After Shunting this 1600 ohm Relay with a condenser we got the following:—

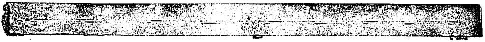
1


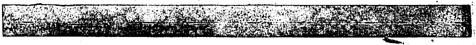
2


3


4


5


6


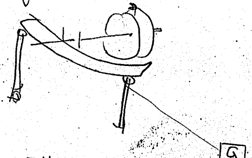
7


Bala........

[illegible] This [illegible]

See if you can put a Charge from plate of Electrophorus into a steel needle magnetized ~~to point North~~ and see if the Charge will make it point from due north also see how near ~~a sub the~~ a substance insulated or not will approach before throwing it out of its track.

See if by any arrangement you can prevent the needle of the [illegible] Galvanometer from kicking to ~~the~~ point



may be wetting the silk fibre
which needle suspended on
will do it =

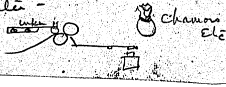
Chromic & permanganic acid
part with their oxygen with
smallest current ~~Hence~~ it is a
great object with Sensitive paper
to get the weakest current to
liberate the most oxygen
so as to produce the most

3.

protoxide, therefore try Chromic
& permange acid with suitable
salt or with other substance
if it should spontaneously
decompose without current
a little, but greater with these
would be a light continuous
mark between dots & dashes
but if you run fast 300 words
per min with perfd paper the
spontaneously made proto would
Not show try it

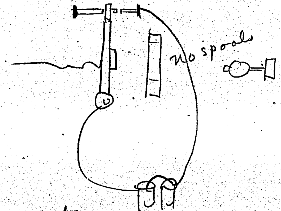
—

See if you can arrange a inking
pad to ink The embossed marks
on Morse Register -



Try Conductivity of mercury + Zinc amalgam in small hole tube see if its high + constant

Try this



No magnet = see if the mere passage of the Current from 2 or 3 good cells or more of Carbon battery through the armature lever & platina points will make them stick. I suspect that when the spring is adjusted so as to just pull the lever away from point when no current is on by pushing it up with finger it wont stick but if battery connected if pushed up it will stick owing to magnetic effect of current on platina points include a Condenser in the circuit.

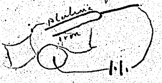
Batchelor ........ 6

you know that when Sulphuret of potash is used with an iron pen - that the pen become polarised thus

Sent — — —

Recorded from clean — — —

on closing the circuit there is an intense black mark on opening it ceases on closing again the Mark does not commence for some time to get rid of this Try a double pen iron & platina Thus



also try Copper Zinc pen with the iron

7

Batch -

Put of 10 good Carbon & ~~test~~ Each one on No 4 of Bradley to get deflection, pick out best one & try & get 9 other that Equal it = then Connect these 10 to a single cup giving the same deflection - connecting the coke of the 10 cup battery to the Coke of the 1 Cup battery & the Zinc of the 10 Cup battery to the zinc of the 1 Cup battery then take the deflection on 1 2 3 & 4

& the 1
of the 10 seperate
seperate every few hours
for 3 days keeping them
on closed circuit all the
time, also take the deflection
all together = I want to
see what action will take
place in the single cell –

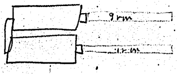
also ~~instead of~~ connect
5 good with 5 good opposing
each other (ie) the coke of one
5 with the coke of the other
5 – closed circuit – take
deflection on each 5 seperate
~~& tap and~~ then connect

together & take deflection. If there is any Current see which battery gives it then change Cups so as to get a balance with 1 or 2 degrees on No. 4.

Put 3 good cups all same deflection on No 4. ~~[illegible]~~ on closed circuit all separately take deflection on all Coils Every few hours wish to know how long a Carbon battery will last on short circuit –

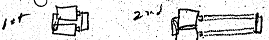
10

Magnet Thing in bridge



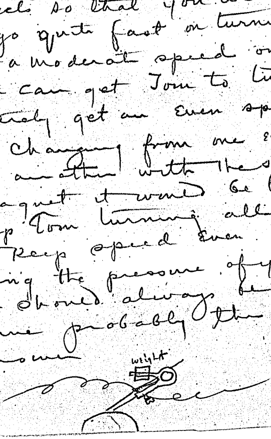
testing for induction - see if the Extension of the Cores by putting two Extra iron Core pressing up against those of magnet will increase the induction Effect without adding More wire.

also Try this



You can gear up those

wheels so that you will have
to go quite fast on turning to
get a moderate speed on receiver
you can get Tom to turn &
thereby get an even speed
in changing from one experiment
to another with the same
magnet it would be best to
keep Tom turning all the time
to keep speed even an other
thing the pressure of your
pen should always be the
same probably this would
answer

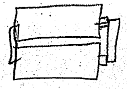


also a whole block of paper should be wet at once so the paper should have the same thickness

take the deflection of battery used on No. 4 Coil & always Keep it up to that deflection & be sure to get bridge resistance correct so not the faintest shadow of Current shows on the paper even in turning slow, it takes a given amount of Resistance to [illegible] show Current on the next pen after 4 on Cant see it on first 1/2 this

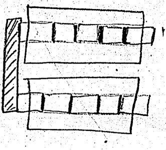
~~18~~ 13

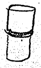
Try Solid Cores this



pull out solid Cores insert core of fine iron wires solid - with regular back & armature see which gives most induction solid or cores -

Batch. Try this for induction & Strength of attraction





core sawed in length of $\frac{1}{4}$ inch & seperated by brass & brass screw or by sealing wax. so each core dont touch but is with a par ~~sec~~ a $\frac{1}{100}$ — Have an Idea that there will be no induction & the attractive strength 1/2 as great as solid Core thurst in same bobbin with same battery

If this is so we can make long ordinary magnets thereby getting @ strength & yet have no induction —

See 1871-Telegraph, automatic for the first 14 pages of this experiment.

Photocopy. Original is in Scrapbook, Cat. 298, Notebook Series.

every 15 or 20 words which is necessary when the machines do not run in any degree syncronously. It also allows me to prevent the formation of false marks altogether and dispensing with the correcting apparatus. I effect this object by means of a large extra hole in the perforated strip at the transmitting station which hole is in line with a contact roller connected to a very powerful battery with its positive pole to the line.

The current transmitted from this Extra hole which is placed at every 15 or 20 words at the pleasure of the perforating operator is to actuate a polarized relay at the receiving station which serves to release two circuit directing wheels N and M which are arranged in such a manner with the recording points A and B and A' and B' that while A and B are recording the top part of a letter A' and B' are disconnected from the line and Earth and prevented from recording a false signal. And while A' and B' are connected to form the other part of the letter the pens A and B are disconnected and also prevented from forming false signals.

In figure 7 is shewn a method for transmitting positive and negative waves in a manner similar to that shewn in figure 1. except that the strip in this case is embossed or indented as it were and in line with two levers A and B held down upon the paper by the springs C and D and both connected to the Earth. Springs f and e are connected to the line, f through the battery MB having copper to the line and e through the battery MB having Zinc to the line.

Immediately and indentation passes under the tip part of the lever it falls therein and allows the platina tipped point to come in contact with f or e as the case may be and transmit a positive or negative current over the wire.

These indentations could be dispensed with and the ordinary perforated slip used to give motion to these levers, a slight groove being placed in the drum to allow the levers to fall a greater distance or the drum might be made stationary and two deep holes drilled in it immediately underneath the points near the ends of the levers, the paper being drawn forward by another drum or the Embossed paper might give motion to these levers by raising them up but of course the springs e and f would in this case be placed above instead of below as is shewn in figure 7.

[illegible]ment works upon one wi[illegible] ~~[illegible] forms a~~

It performs ~~three opera~~ four operation to wit:— rotation of the type wheel imprinting the letter feeding the paper and correcting the type wheel =

These various operations are performed by power derived from two Electromagnets one placed in the main line, rotates the type wheel and moves the Corrector & is called the type wheel Magnet the other is placed in a Local Circuit, Controlled by a vibrating circuit closing ~~point~~ spring upon the Lever of the type wheel magnet, this magnet imprints the letter, feeds the paper and releases the Corrector,

The transmitting ~~pa~~ devices of the instrument Consist of an Electric Engine driven by a local battery, the power of

2

which rotates the circuit break wheel and Stop arm devices of the Key Board -

The Engine has two pair magnets over the poles of which is a revolving armature the Electrical pulsation necessary to give it a Continuous rotation by [illegible] from a Contact spring operated by the Engine shaft!

The Speed of the Engine is regulated by a Governor which in rising comes in Contact with an arm and Cutting off all battery power ~~from the Engine magnets~~ (prevents the engine from increasing its speed)

The Main ~~break is~~ circuit breaking devices is a wheel the teeth of which gives ~~make~~ a vibratory motion to ~~its~~ an arm having two platina point which Close upon two springs having

①

This instrument works upon one wire, It performs four operations to wit:- Rotation of the Type wheel, imprinting the letter, feeding of the paper, and the correction of the type wheel.

These various operations are performed by power derived from two electro-magnets. One placed in the main line, rotates the type wheel and moves the corrector or Unison, and is called the Type wheel magnet.

The other magnet is placed within a local circuit and is controlled by a contact point upon the type wheel mechanism. This magnet imprints the letter, feeds the paper, and releases the corrector and is called the Printing Magnet.

The transmitting devices of the instrument ~~consists of~~ are rotated by an electric Engine driven by a local battery, it being used in place of a clockwork etc owing to its comparative simplicity and the facility with which it may be regulated

The Engine consists of two electro-magnets over the poles of which is a revolving armature secured to a long shaft, a vibrating contact point operated by the rotation of the shaft is so arranged that a current from a local battery is alternately thrown through one ~~pair of~~ magnet to the other producing a constant rotation of the shaft as long as the battery is of sufficient strength. The speed of the Engine is regulated by a governor which as the speed increases rises to a contact point which may be set at any required position when this contact takes place. The battery is short circuited i.e the battery power is shut cut off from the magnets consequently the speed cannot be increased beyond this point, This contact peice being adjustable it is obvious that the speeds of all the instruments upon a line can be made the same, an essential point as will be presently shown

The device which intermits the main line pulsations to rotate the type wheel is connected to the Engine beneath the base of the instrument the connection being made by gear wheels,

The "intermitter" or main break as it is generally called. consists of a wheel. having fifteen teeth half of the number of characters as there are upon the type wheel, Upon the edge of this wheel is a pivoted lever having upon the end which rests upon the toothed wheel a steel tooth and upon the other end two platina contact points impinging against two other plating points secured seperately to springs

When the toothed wheel is rotated the teeth upon its edge give a vibratory motion to the lever bring the two ~~con~~ platina points upon its end in contact ~~whed~~ with those upon the springs as every tooth passes along. Thus closing and opening the main circuit fifteen times to every revolution of the ~~type wheel~~, Toothed wheel. One of the contact points it set a ~~tel~~ short distance ahead of the other so as to take the spark entirely off from the other point ~~so as to~~ and to prevent its fusion and thereby ensuring perfect contact

The stoppage of the pulsations after the required number is sent to bring the type wheel to the desired letter is effected by the depression of the key which represents that letter, The keys have ~~a~~ long arms projecting to and working into a circular ring in the center of the base of the instrument. In the center of which is a shaft carrying two gear wheels one secured permanently to the shaft and kept constantly in motion by the Engine during the transmission of a message and the other gear wheel ~~being loose~~ which drives the main break wheel being looked upon the shaft by a ratchet wheel and pawl of arm. So that by the depression of a Key its arm is lowered into the path of this detent or arm which coming in contact with it lifts it out of the ratchet wheel and the main break wheel is stopped and entirely detached from the other wheels which continue to revolve. If the Key is raised a spring pulls the detent inward to the ratchet which locks them together and the break wheel is again rotated ~~a~~ A slight friction obtained by a spring connecting one with the other is used for the prevention of a rebound which takes place when the breaking wheels are suddenly detached from the Engine wheels,

The Engine is supplied with a starter which consists of a rod extending through the base of the instrument having on one end a Knob and uponthe other a flat spring in the path of a ratchet wheel upon the Engine shaft, so that if the engine fails to start when the battery is turned on as it sometimes does, the rod is pushed inward the spring upon the end of which engages in the ratchet wheel and gives a motion to the shaft

The battery is switched on by a rod extending through the base at the right hand of the row of Keys upon the top of which is a large hand button with a pointer and underneath an insulated collar and contact springs, so that by turning the pointer from you the current is switched into the Engine. And by turning it towards you it is cut off. ~~and~~

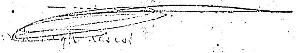
This switch performs another Operation which is that when the message has been sent the turning of the pointer towards you closes the main line an prevents it being opened by the breakwheel which does not always stop on the proper position to close it,

The corrector consists of an arm called the unison arm extending from ~~the~~ the top shaft of the instrument to a deep threaded screw called the unison worm upon the type wheel shaft a pin upon the end of which runs in the screw

The number of threads on the screw are such that when the type wheel is allowed to make three complete revolutions without printing of a letter the action of the screw brings the unison arm up to a stop pin on the type wheel shaft which is blocked at the zero point upon the type wheel (The dot next to the letter A) an cannot be rotated farther until the key representing the zero dot is depressed which allows the printing lever to rise and in doing so the union arm is thrown ~~away~~ out of the path of the blocking pin to its original position at the other end of the [illegible]m and the type wheel is free to rotate. while a message is being printed the unioun arm is ~~con~~ kept away from the blocking pin by the constant raising of the printing lever in printing the letters of the message. The type wheel is allowed to run to unison before each communication so as to ensure their correct position ~~of the type wheels,~~

18th Extra memo

With the Caustic K & NaCl paper we can on plain line without shunt get 1200 a minute, ~~with high resistance shunt at speed of~~ recorded on second circuit thus,



~~with high resisd~~

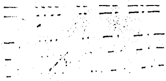
with high resistance shunt thus at slower speed.

~~with~~ still lower res in shunt thus

with less

with 200 in shunt

with less nothing ~~dots~~ ~~equal dots~~ dashes being dist & dots gone



This shows that the [illegible] throws back a secondary charge exactly like a Condenser.

what appears to be so strange is that so small a surface as a platina point should send so large a discharge almost equal to the current which passes over 1500 ohms from 25 cells of battery =

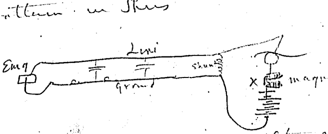
The problem ~~thus~~ resolves itself

2 = 18th Extra Mem

into some paper in which there shall be a chemical that will not polarize & give a back charge and yet be sufficiently delicate to allow the lever to move at high speeds.

Last night tried the experiment of breaking the circuit very rapidly with a revolving break wheel with half of closure & 1/2 opening but it did not give very good results in fact not any — then tried having 9/10 closure & 1/10 opening neither revolved slow & fast no better =

Tried a shunt and connected a magnet of 200 ohms [illegible] pattern in shunt



The object of inserting the magnet in the circuit between the battery

3: 18th Extra mem

The instrument was to weaken the 1st part of every signal sent leaving the last part full strength & cut off sharp for instance on closing the Current passing through the magnet ~~and~~ meets the self induction Current from it and is weakened, ~~away~~ but quickly gets full strength as induction Current dies away on opening the Extra Current from the magnet has no place to circulate it being broken entirely by the perforated paper cannot go on the line & prolong it & make the record shaded better

— ---- — —

As has been previously mentioned the EMly record where there is no static is thus with a straight Current.

— ---- — —

I thought that the above would compensate & make it even for

4 to 18th Extra Memo

Some reason could do nothing
probably because we had to use a
shunt and the secondary charge
from the E.M.G. threw it out
of adjustment, as above described.

I finally thought to
have too light a pressure on
the lever of the E.M.G.
The delivery is apparently
increased by pressure =

~~[illegible]~~

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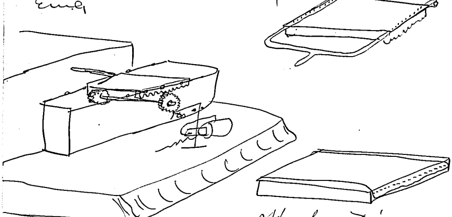
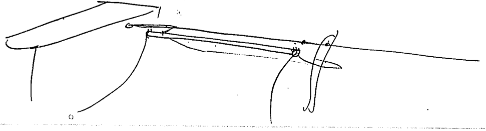
The signals may
be repeated by the EMG
~~give best solution~~; dont give solution.
or it may be recorded by
EMG



Stuck on pins

Posted on

Glass base ~~so~~ thick glycerine
to only stick it or hold it by
suction & 4 pins to keep from
moving



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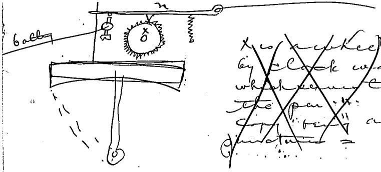
instead of connecting the vibrating recording point direct to line it may be put in a local circuit connected to the Emg. Or the paper to be recorded upon may be vibrated & the roller or pen on the lever of the Emg may record in ink or have a vibrating pen attached which it deflects to form its marks.



~~X is a ratchet worked by clock work which serves to vibrate the pen X. the sending copy being a fac simile of signature =~~

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Mention a paper ~~moistened~~ in some Solution which laying on a metal like hydrogen or Oxygen will reduce or make some change in the ~~Or~~ surface of the metal ~~paper~~ underneath the paper so as to mark it through & use it for repeating (=)

Mention that the apparatus may be worked duplex

~~Say that Embossed writing~~ & a vibrating pen like X. ~~Ca~~ Leonard

~~or~~ use of paper written with a Sol of Bicarb. K. if singed will raise up 1/16 of inch which can be used for opening & closing Circuits

Relating to Fac Simile

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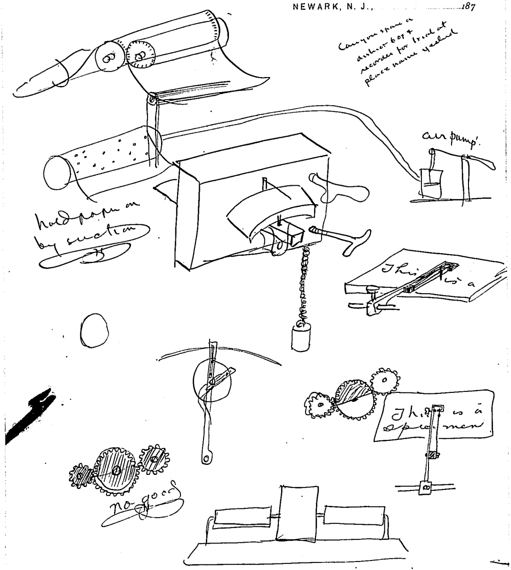
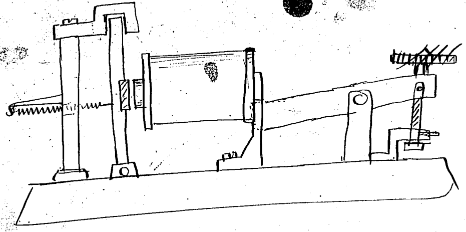
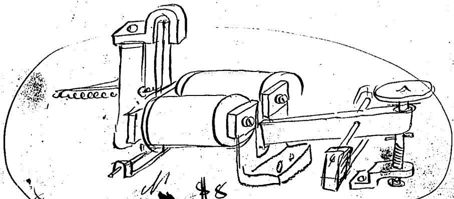
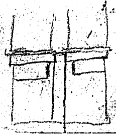
Can you spare a dasher box & recorder for trial at place name [illegible]

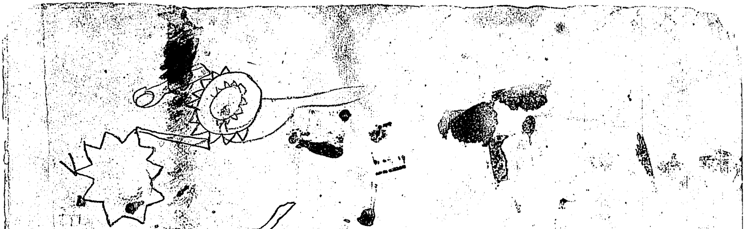

air pump'.
hold paper on by suction
This is a
This is a specimen
no good

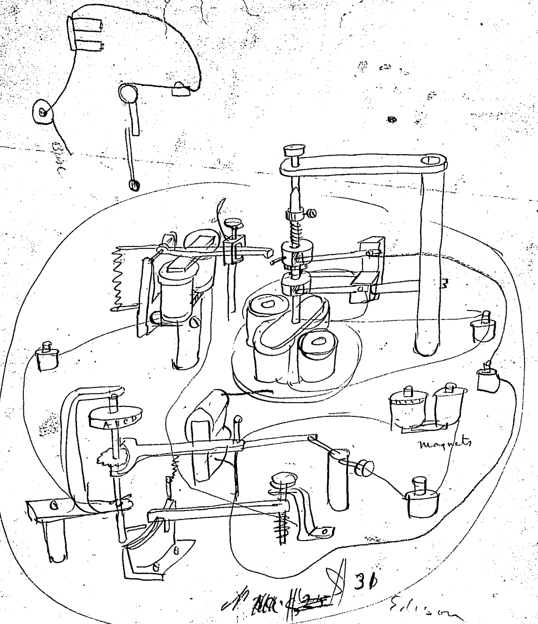




N[illegible]. #8

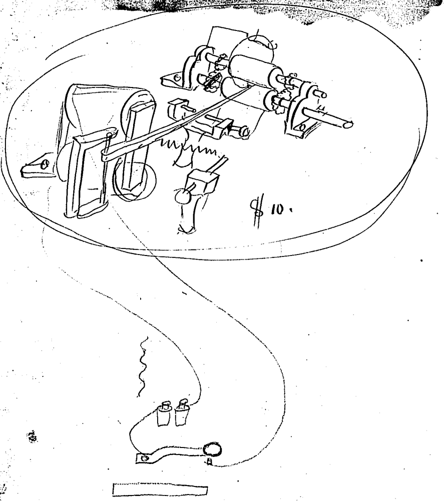





Batt
A B C D
A
magnets

36

Edison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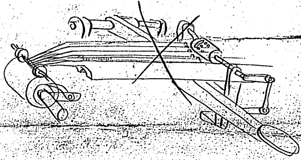
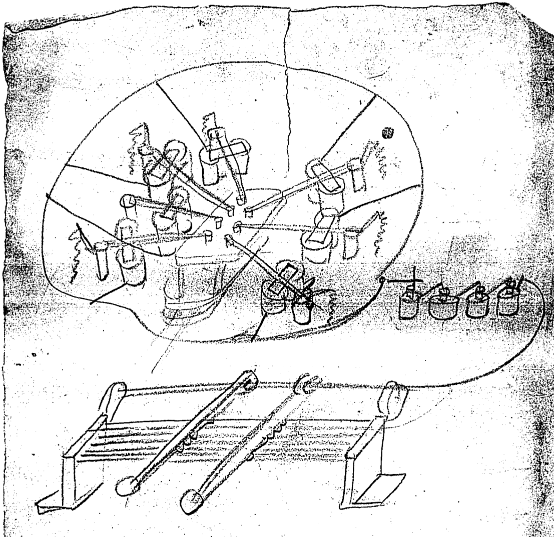
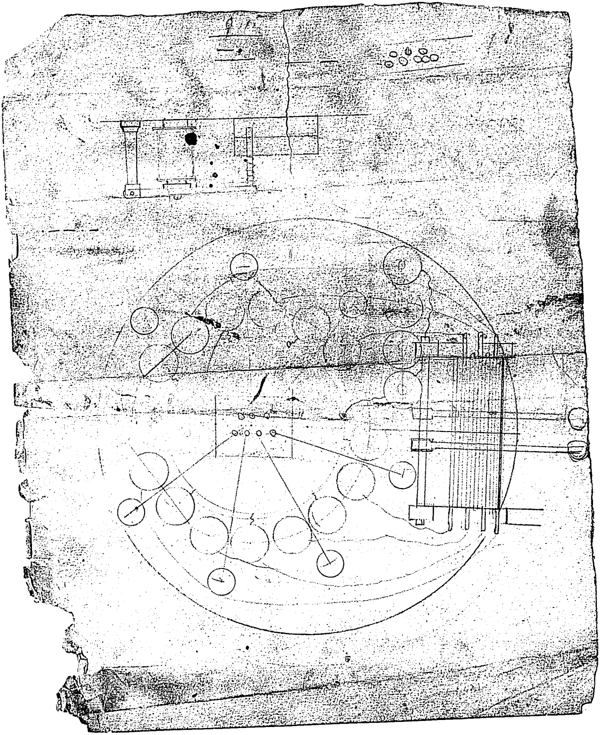
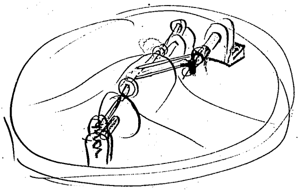
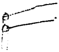




~~15~~, 13







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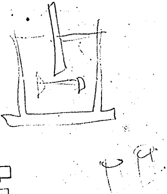
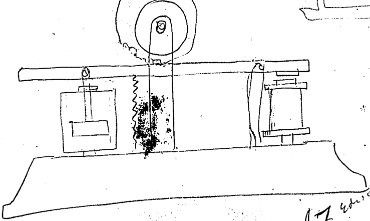
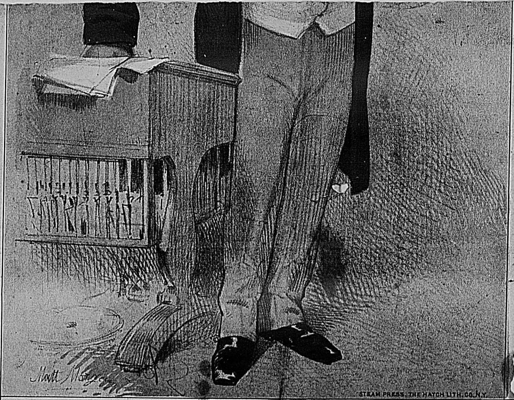




$76 Edison



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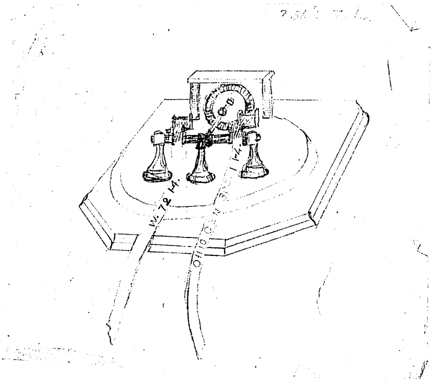

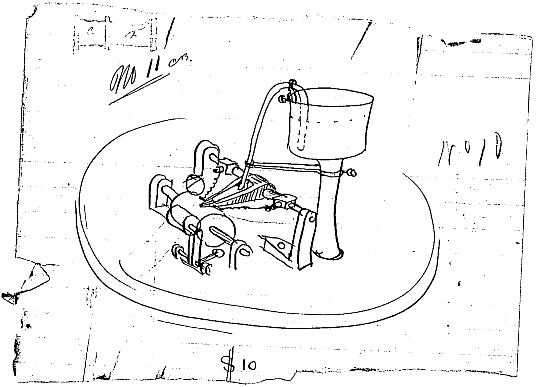

No 11 OB.

No 10

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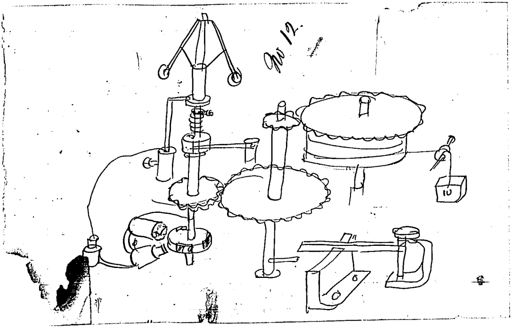
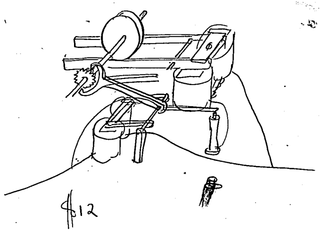
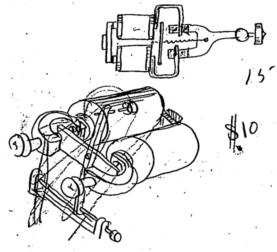



Stock ticker

1884

$12



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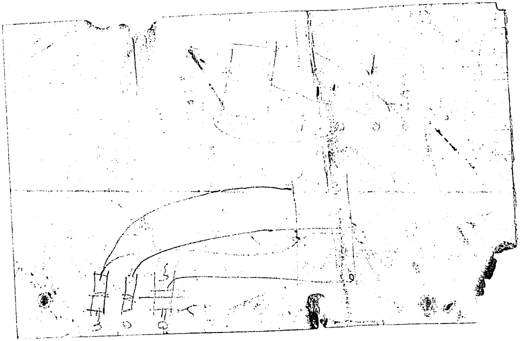
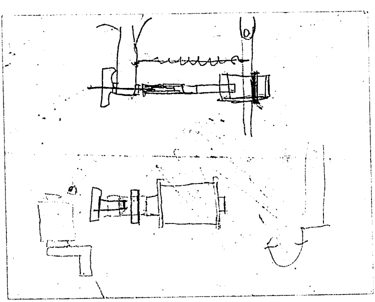
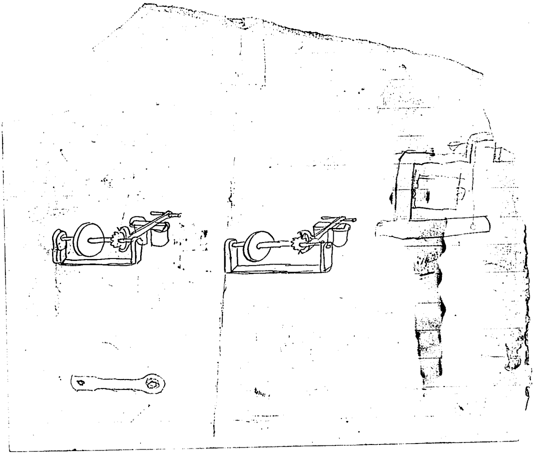


No 1

C S [illegible]





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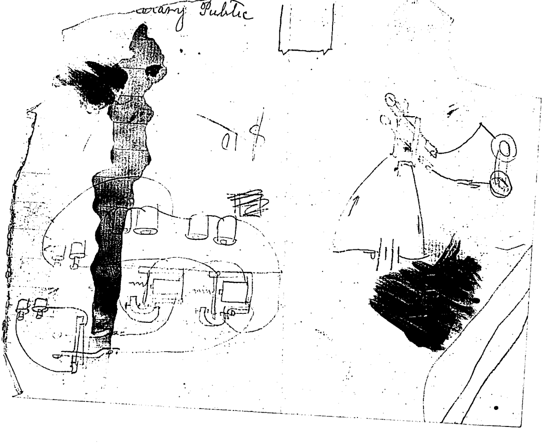
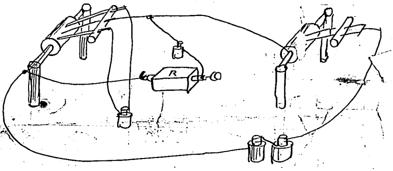


No 1



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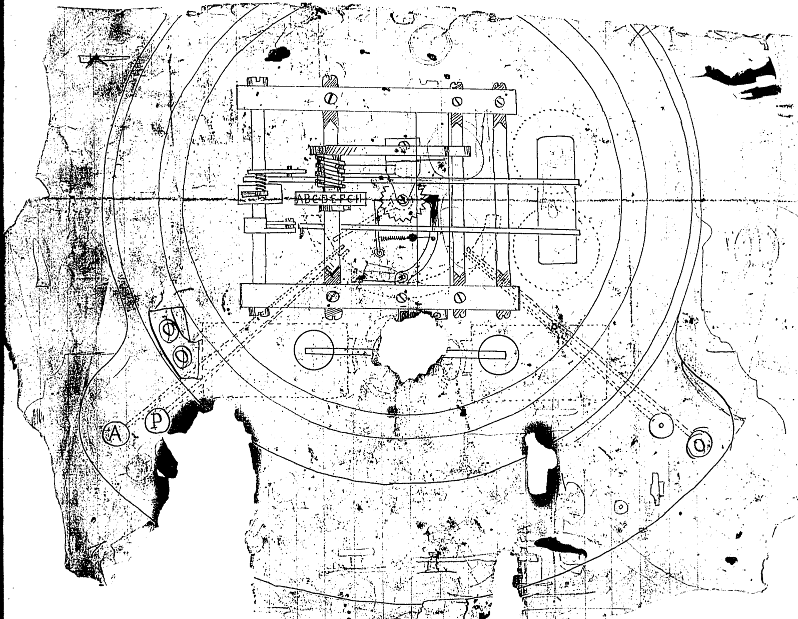
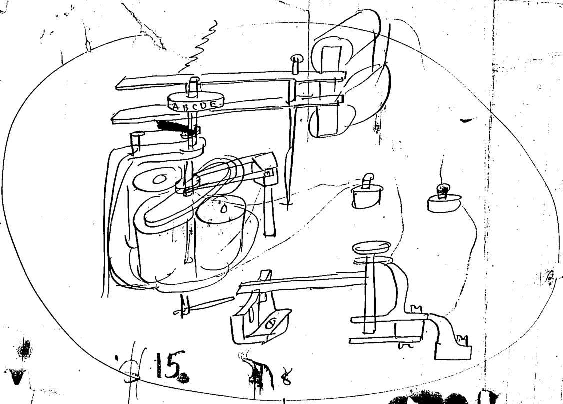
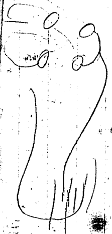
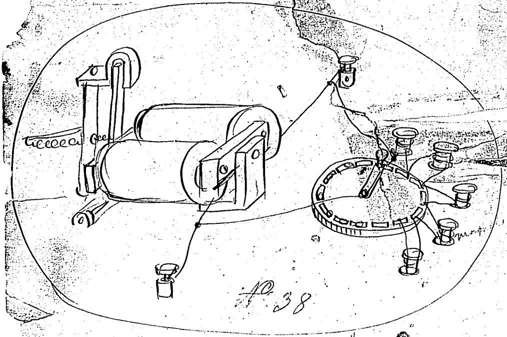

ABCDEFGH
A
P
Q


ABCDE
M
M
15
8



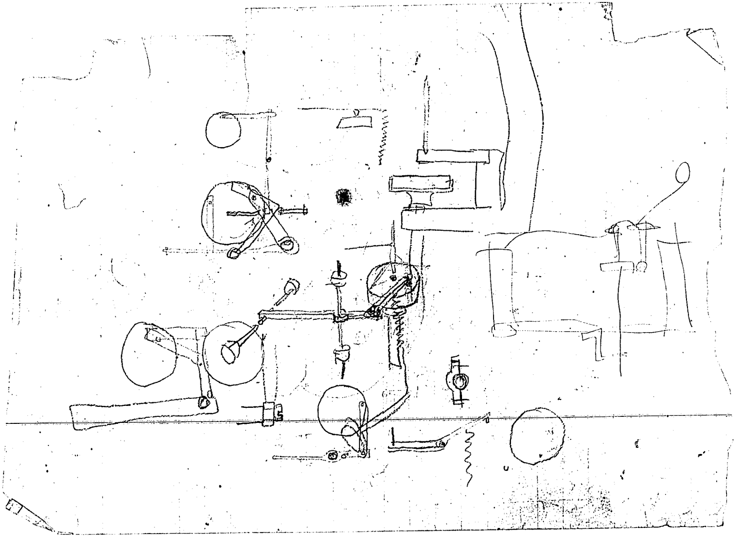
Telegraph ?

No. 14



No 38

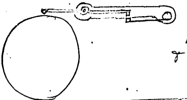
#12



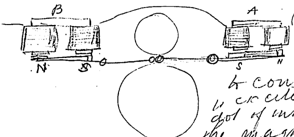
Base

bais & so draw the upright over far enough to feed for the length of letter.

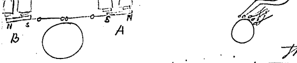
The Trans-mitter is simply a drum with 5 adjustable levers or provided with plat points at one end & cam for lifting at the other & pivoted in middle I can put these all at one side of drum or 3 at one side & 2 at the other



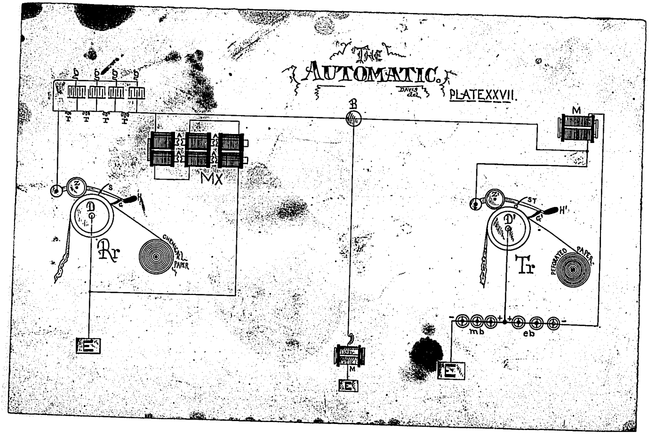
The Receiver or Reporting Inst. is composed of a drum driven by clockwork on which run 5 roller to these rollers are fastened a levers pivoted in middle & the other end is supplied with polarized armatures each roller has a magnet to control it & when its magnet is excited the roller makes a dot of ink on the paper. when the magnet is not excited the roller rests back on the inker by spring



It would appear that having letter embossed in five lines & receiving a letter composed of five lines made by five different roller controlled by 5 different magnets that it was necessary to use 5 different wires to perform the operation. This I propose to do with 3 ~~instead of 5~~ in the following manner.



The first 2 pens on the transmitter are set one ahead of the other so that the first sends a positive current along the line & the second sends a negative immediately after on the same line these are received on the magnets A B whose polarized armatures respond one to each current negative & positive making 2 dots of the letter on one line 2 more dots are made by the next 2 on another line the other dot by the other line



THE AUTOMATIC.

PLATE XXVII.

DAVIS del.
b
b
b
b
T
T
T
T
B
M
A
A
A
MX
Z
S
H
G
D
Rr
CHEMICAL PAPER
E
Z'
ST
H'
G'
D'
Tr
PERFORATED PAPER
mb
eb
M
E
E

Iodized paper will show
a good black dot with
1 cup of battery through
1 Million ohms in 6 seconds
with 5 cups it gives a
good continuous mark
Capable of recording
100 words per minute

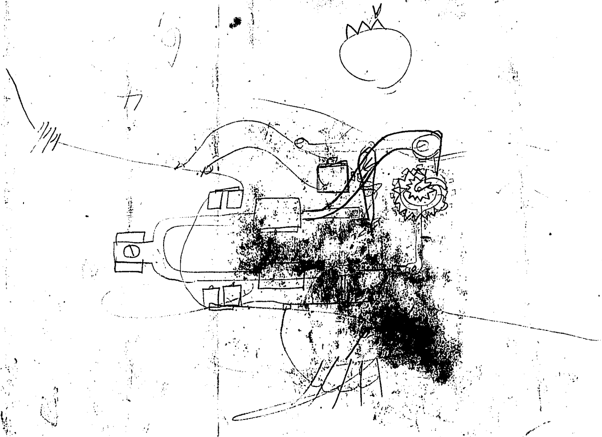
Decreasing the thickness
of the paper does not
practically
materially decrease the
resistance

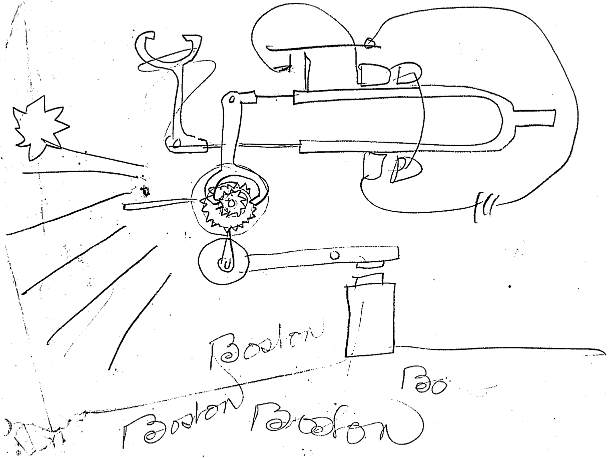
If Sulphocyanide of potassium
to which is added Hydrochloric
Acid or Muriat Tin
(Get formula) White Mark
be recorded on Red lock paper

Logwood wood solutions
find out more about =

Bu7. R

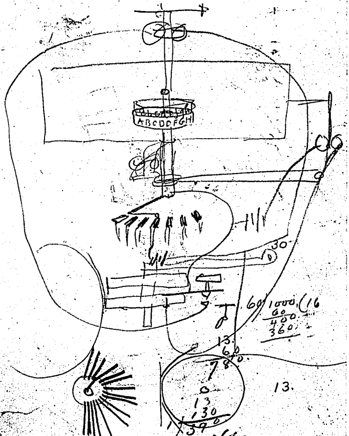
Acoustic Printing



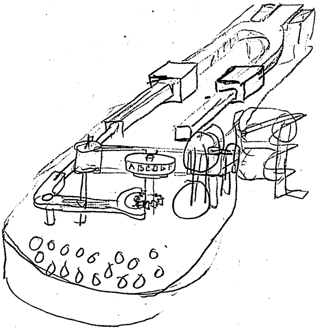

Boston
Boston
Boston
Boo

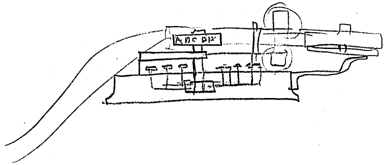
(1872)

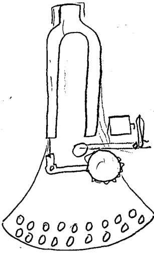
(Typewriter)

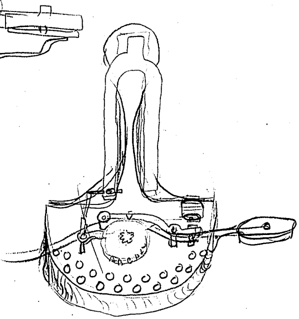


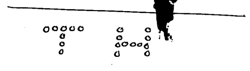
ABCDEFGH
30
60)1000(16
600
400
360
13
60
780
13.
7
0
13
130
1390
of sec


A
ABCDEF


ABC DE

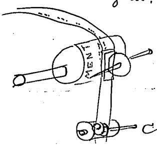


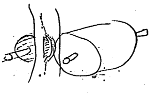




Band . . One pen.
Clockwork run together,
receive like dot & dash
when received wind on
an exact drum then transfer

also cover drum with paper having
auto glue!



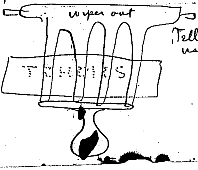


Cloxwk

punching out & transferring

also Transferring peculiar Marks by pressure
on specially prepared Chemical
paper —

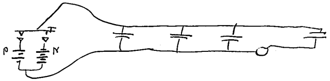
200000 bands



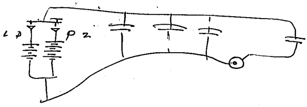
Tellurium
use Hypochlorite Sodium
or Electricity

Sketches + Notes

It might be done by sending every succeeding word with a higher battery power

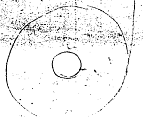


N Battery. 40. P Battery 40 . Variations



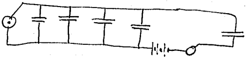
P.2. 40 cells. P 1 20 cells. Variations

$90
5
6

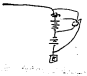


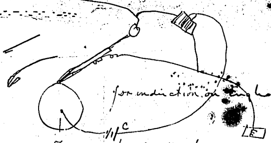
Cable

5



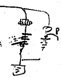
40 cells. Carbon Teller



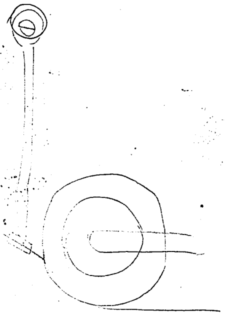


for indication on English lines

Tellers & Ae both try on W Line with a recording Counter



(Telegraphic Transmitting Instrument?)



Telegraph

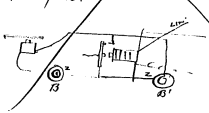
opened & closed by the relay P in the main the others are worked by a lever & magnet in local which may be shifted from one escapement to the other by seperate Electro magnets or by a mechanism Controlled by the relay & seperate Electro magnets, Type W relief [illegible]

HE says that the printing may be effected by any suitably acting power Com in [illegible]

He describes a momentum wheel which is Kept in Motion when the type wheels are being operated but which comes to rest when the type w are stopped & closes a local Circuit which releases a clockwork or [illegible] to some other force with which ptg is done This principle is same as Callahan fly wheel arrangement on Bank inst

describes working several insts by p relays in on main line, the Inst magnets being in local. to get Extra Copies secondary discharge from the local magnet which reacting in the same direction as the battery current tends to prolong the time of demagnetization = . ~~Fig 3 is a modification of the~~ ~~of the plan the above plan~~.

Fig. 3. Shows. Fig. 3.



The two batteries are included within the ~~Circu~~ local circuit ~~and are~~ ~~the zinc pole of one battery is connected to the zinc pole of the other battery. and Connected to oppose each other~~. with their like poles facing each other. ~~when~~ if the lever of the relay remains unattached the batteries neutralize each other and the local magnet is unaffected. If the lever of the relay be brought forward ~~one of the batter~~ the circuit

In the autographic facsimile I propose to regulate the two Electric Engines drawing the recording and transmitting mechanism (or perhaps I shall use another power such a Clockwork) by a fork or reed at both ends of the line in a local circuit controlled by the main reeds or fork relays on a controlling wire, perhaps I may be able by the use of a ratchet wheel + pawls or V shaped wheel + fork to drive the mechanism entirely by the local fork = On the other hand the idea occurs that the recording use of a line may be done by using the wire 3/4 of the time + using the other 1/4 to actuate a reed or fork to regulate the mechanism + perhaps I shall be able to transmit + receive by chemical recording

We now conclude that lower forks will give greater margin by giving more time for the line to discharge we are going to put the chemical instrument on the low fork and ascertain its rate of vibration,

Then we are going to turn 2 Duplex ~~relay~~ sounder with a transmitter and see ~~how~~ what is the lowest number of vibrations per second that will allow good rapid signalling then intend lowering the vibration rate of the forks if it is found that they can be lowered with advantage =

Caveat 73 - ~~signed~~ ordered about Dec 75 - signed early in Jan 1876.
sent Serrell. Dec 22 1875

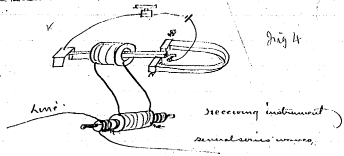


Fig 4
Line
receiving instrument
several series waves,

use of induction coil to throw undulatory into reverse currents to increase Efficiency, = Polarized receiving instrument, If this has nothing to do with Spkg - let them admit it in writing

Caveat 74 - ditto as above. applies to Case 145

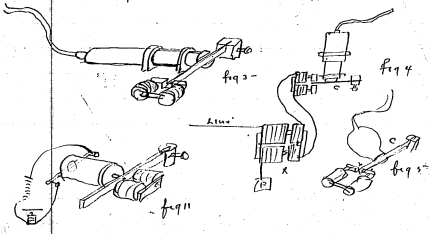
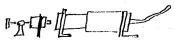


fig 3 -
fig 4
c
Line
x
c
fig 5
fig 11

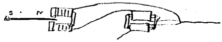
Caveat calls x induction coil = says that the c springs may be in time with the waves or "out of time" ones - Spring rests on soft pads between the poles. WU Contract Dec 14 1875 on Acoustic. = first saw account Reis Tel in some scientific publication in New York 1872 or 1871. I think, = ask Wilber for his Sawyer affidavit dates.

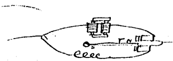
Batchelors small book speaks of All night on Teliphone Thursday Nov 11 1875-

Spice came to work Nov 29 1875-



Batchelors book gives date Dec 21 1875-

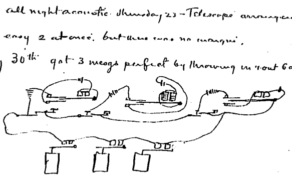




Says Edison struck idea of working receiving mag by induction,

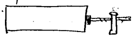
Says all night acoustic Thursday 23 - Telescope arrangement got them to work easy 2 at once, but there was no magnet,

Thursday 30th got 3 messgs perfect by throwing in & out batteries;

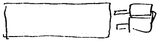


Dec 22 Batch paid Bill $12 for tubes,

July 6 1876 - Adams writing



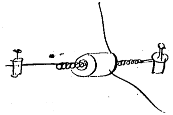
Says long brass tube with felt wet with Water & Salt & water.
for receiver used parchment with iron pasted on, and magnet
Says gets good many words plain such as "How do you do"



receiver T opone.

Nov 16 1875 –

witness. Batch.
Edison
Adams
Kruesi



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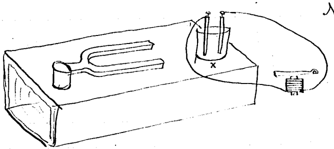
Nov 16/75

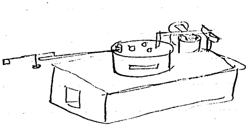
Batch. Edison Adams Kruesi

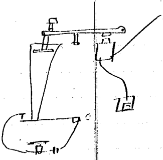


x – quickly polarizing battery which depolarizes powerfully with least jar as tuning fork responds only to vibrations in unison with its swinging time, this sets resonant box going. Knocks loose H bubbles & renders closed, .

---

Nov 26. E+B – 1875 = I say instead breaking ckt like Gray throw in & out batteries same size. preserve continuity = also show this





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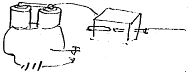
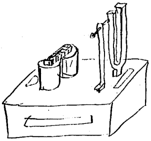
Nov 26 –
Jany 1876 – Electrodes –
E+B.

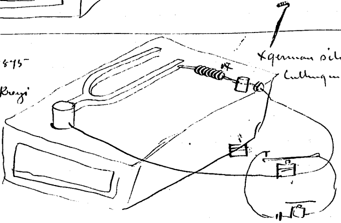




Nov 12 75 = E-B. Adams EHJ

Nov 16 1875

E-Adams, B-Kruesi

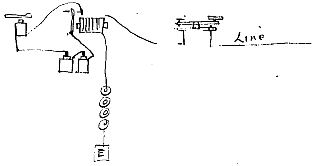


x german silver

Cutting out Resistance

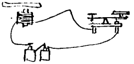
To ~~make~~ Set up a Relay Key & Sounder

1



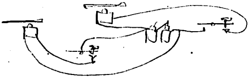
to make a local circuit with Key & Sounder

2



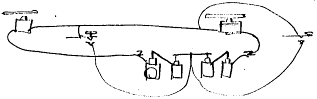
to work two ~~two~~ Circuits from one battery

3



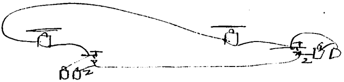
To arrange a circuit with two Keys and two Sounders that shall be operative with the Keys open

4



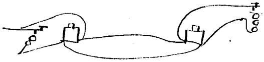
or

5

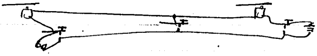


to make one sounder open and the other close when a key is closed

Another Mode

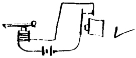


to Combine a third key as in 5

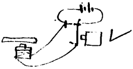


to work a local circuit with sounder by relay

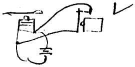
1



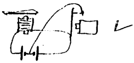
Second plan.



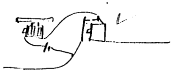
Third plan



Fourth plan.

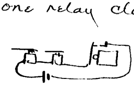


Fifth plan.

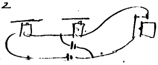


To make one relay close two Sounders

first.

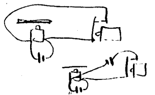


1½

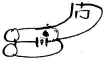


Fourth

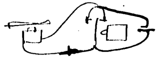
fifth



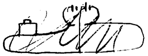
also 6th

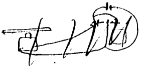


to make a Sounder Close & open when the Relay armature is brought forward

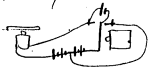


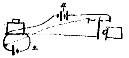
Second.





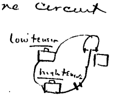
to make a Sounder Close & open twice when the Relay lever is brought forward



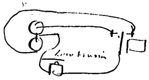


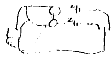
to Keep one Sounder closed and vibrate the other upon one circuit

first

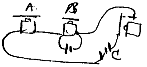

low tension
high tension

Second


Low tension

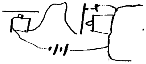


to make one sounder close and the other open



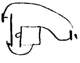
to make A close with the Relay. and B ~~close & open twice~~ open & close
Double the Battery C

to make a self vibrator



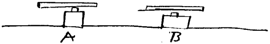
add battery to the local until it will exceed by a small fraction the Effect of the main Current in the relay. it must pass through the relay in the reverse direction to the main

Simple vibrator



Vibratory Movements to produce two distinct Movements of magnet levers independent of each other.

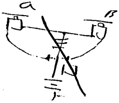
first. ~~Magnet~~ Without Locals



to work A & not B. have a light tension & send with 10 cups.
to work A & B send with 20 cups.
to work B and not A. Send with 30 cups
to close A and then close B ~~add~~ put on 10 cups to close A. and then add 10 to close B

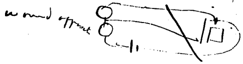
Call Sounders Magnets

to work two sounders separately

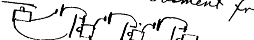


~~to make A work sluggish & B sharp~~
~~add~~

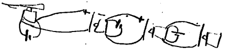
to work without breaking circuit



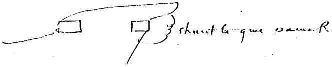
to obtain a slow response movement from a magnet



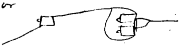
to obtain a still slower

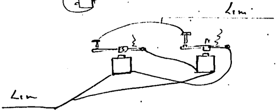


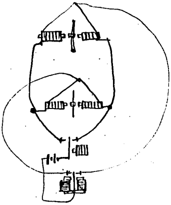
2

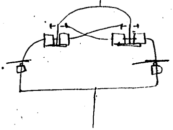

shunt to give same R

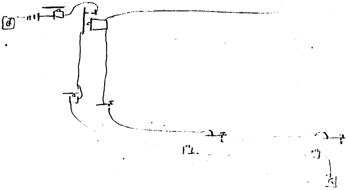
or

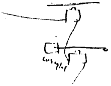


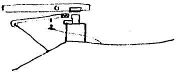


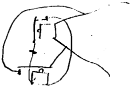






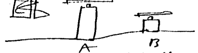






short ckt relay here

Second.

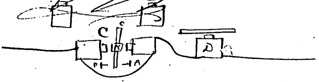


Transmit short pulsations ~~with~~ will spaces) ~~and~~ B will respond but A. owing to its length has a greater charge & discharge time hence will not respond. hold the current on permanent and A respond. The charging & discharging time of A may be made greater by slipping over the iron core a brass tube, to increase the discharging & charging time of B Saw a slot longitudinally ~~with the~~ to the Centre of the iron Cores from end to End,

to increase the surety of this movements. make the length of the waves equal to the intervals between -

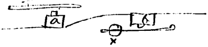
and to still further increase it reliability. ~~or~~ transmits the waves with say 20 cups Positive and space with 5 cups negative. to Keep A closed permanently while ~~Third~~ B is vibrating increase the length of the waves and decrease the intervals of time between says 2 to 1.

Third =



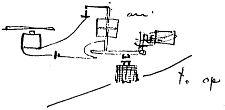
Send Positive and negative waves the Lever C ~~being~~ being provided with a permanently magnetized armature goes from ~~right to left~~. back and forth with each reversal while the Electro Magnet D will remain completely inactive when the reversals are rapid — to bring D into action ~~dwell~~ Keep ~~upon~~ on the positive or ~~negative waves~~ for several seconds,

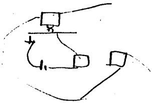
fourth



a b are two Electro magnets the retractive force of a Being a spiral spring & that of B a weight = both having the same power if rapid pulsations are now sent the lever of A will respond while ~~that of b will be unable~~ the magnet b will not ~~have sufficient force~~ be able to overcome the inertia of the weight if the pulsation is prolonged the lever & weight X is drawn towards the face of the magnet =

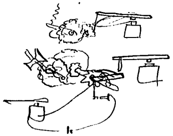
The lever may be held there by & a made to repeat ~~increasing the length of the following pulsations~~ and by transmitting the ~~waves~~ same number of waves per minute but increasing the length of the waves and decreasing the spaces ~~Saya~~ or in other words allow the ~~wave~~ to remain 3/4 of a second & ~~Diff space~~ 1/4 of a second fifth





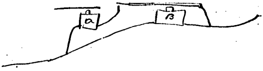
add to

Sixth



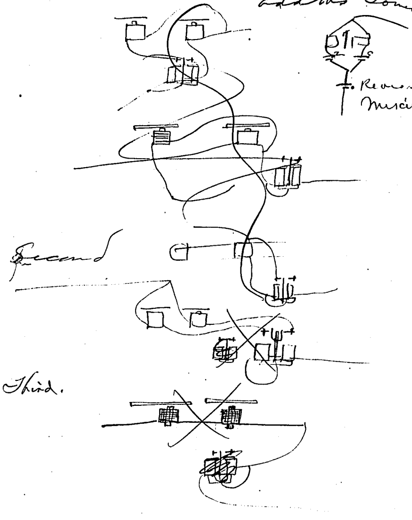
Vibratory without second Circuit, the second Magnet, ~~Obtain~~ obtaining the Current from derivations

first



~~The Transmitting battery should be of low resistance~~

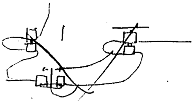
17

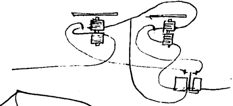

add this somewhere:

Reversals
Miscellaneous

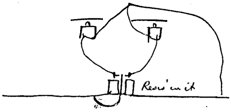
Second
Third.

18

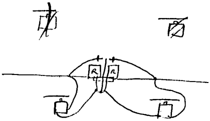




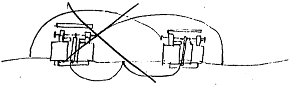
fourth



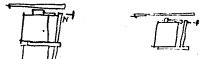
5th

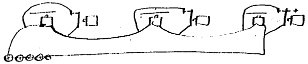


6th

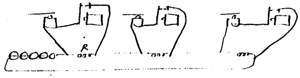


8th

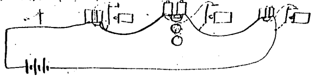




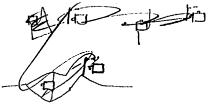
fourth method.



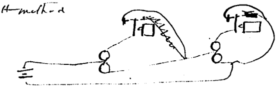
fifth method



Sixth method

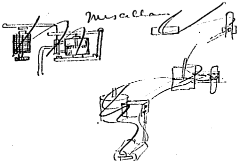


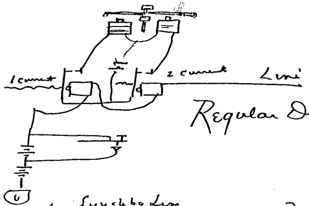
6th method



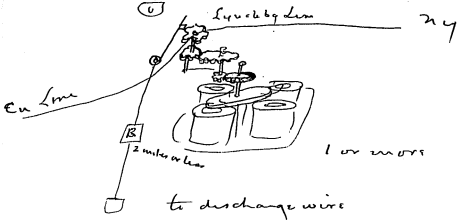
~~[illegible]~~ when the relay levers rest upon their back points the Current pass through the Local magnet in opposite directions and produce no ~~action~~ effect. but when ~~one the~~ ~~Cor~~ helices is cut Current is broken through one helices by the action of the relay lever the ~~re ma~~ remaining helice becomes active and the sounder "Closes"

Miscellany

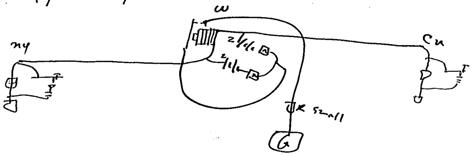


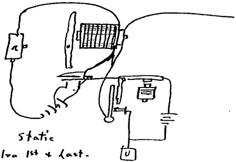

1 current
2 current
Line

## Regular Duplex


Lynchbg Line
ny
Cu Line
B
2 miles or less
1 or more
to discharge wire

## Repeater for Auto

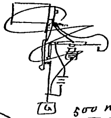

w
ny
Cu
2
2
R small
G



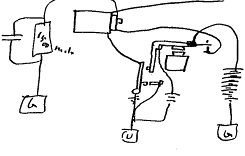
Static

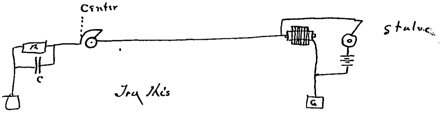
Close Extra 1st & last.

increase & decrease at moment of opening & closing by mechanical means for static



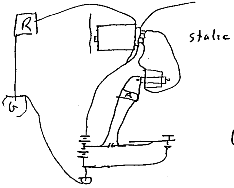
Or make equaling Relay coil twice as strong as line coil & double Resistance

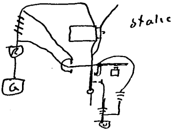

500 miles
1500 miles
G
U
G
Double battery

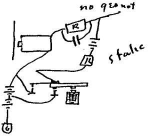

Center
R
C
static
G

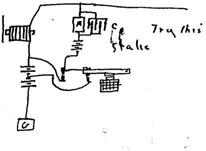
Try this

Duplex static current.

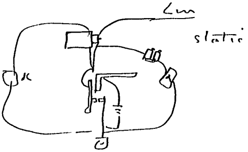




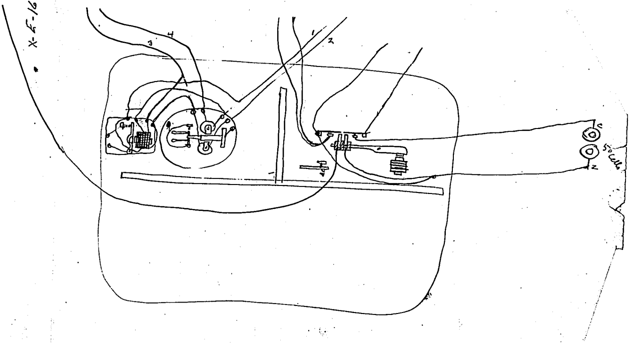

no ground
R
static
R
G

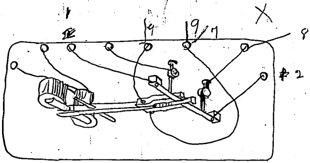


Try this


Lm
static
K

X-E-1684

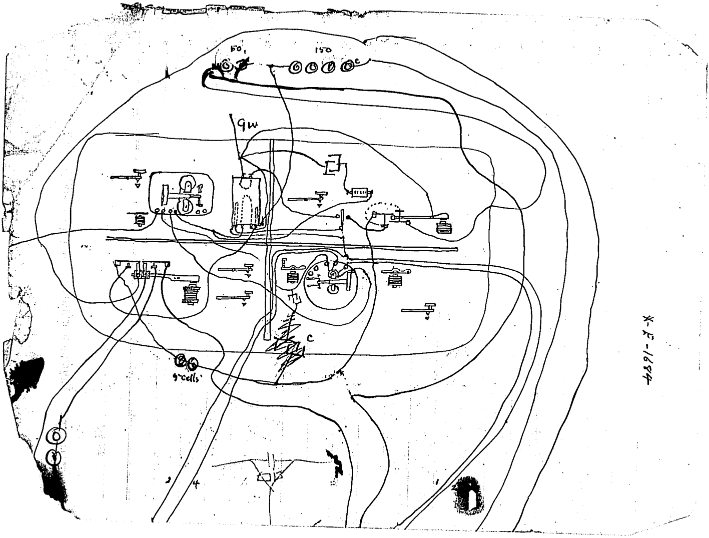

3
4
1
2
c
z
5 cells



8 x 5

3

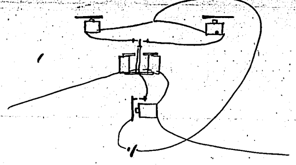
(X-F-1684)


50
150
c
9w
c
9 cells
2
4
1
2

X-F-1684

Two movements with Local. and polarized magnet

1



Movement

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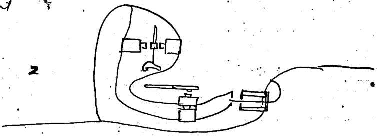

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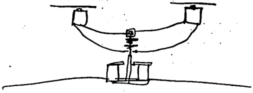

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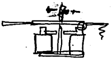

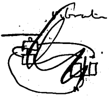

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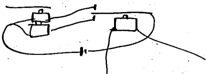
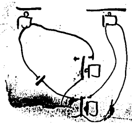
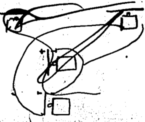
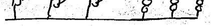
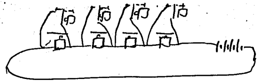


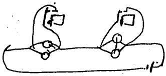


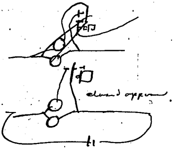
print on open & closed





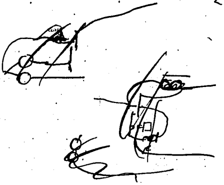


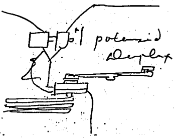




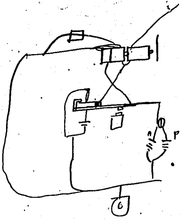
closed oppos.

Local Compensation





polarized duplex



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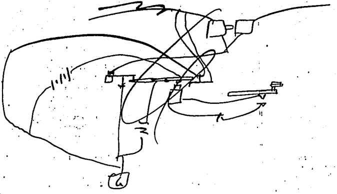
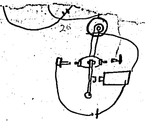
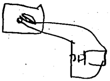
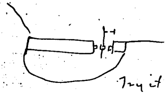




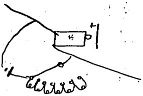
Vcb 2

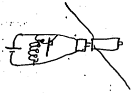
Vcb 3

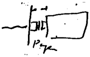


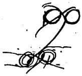


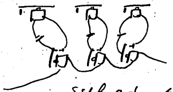
Try it



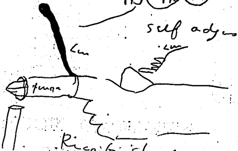








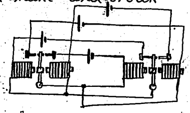
self adjuster



Ring by shock

Self make & Break

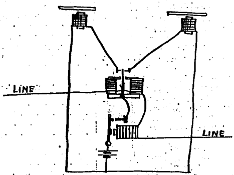
Self make and break



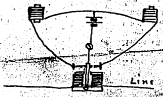
Self make & break.

Show Sunflower
" Kramers.
old Universal
" " slowing relay

Two movements by intermitting P & N Currents



Second. by a centered tongue



Shew Central & a reversal dup Wheatsn ✓

19 " " " dif.

7 " ——— 2 in same direction Wheatsn;

" ——— 2 " " differential,

22 " ——— Double principle;

" ——— also [illegible]

" ~~reversal~~ dup'con with repeater ways show connections

" dif duplex — do " "

" reversal - do Wheatstn.

reversal do dif

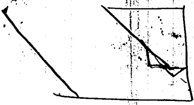
" Shew straight repeating on smaller circuit Morse

" also into a second Central

also " " double without Central,

8

Experimental



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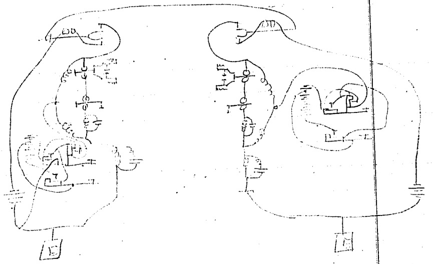
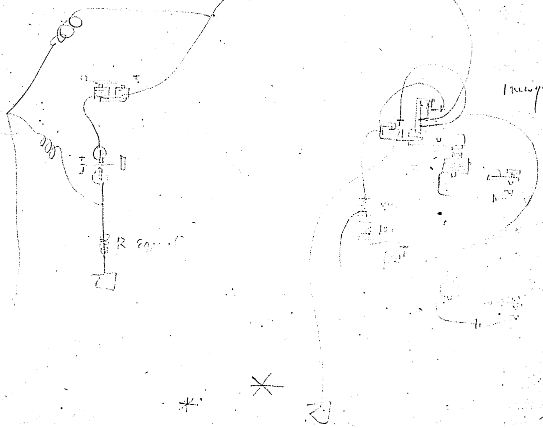
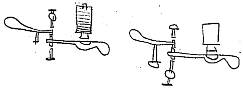
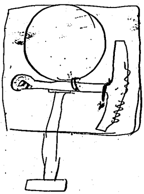


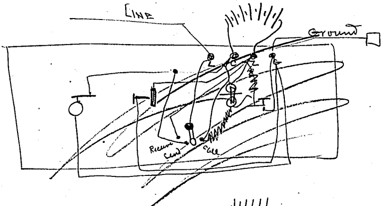
Sextuplex.

T A Edison
Chas Batchelor


R equal
Many







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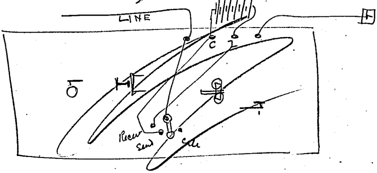

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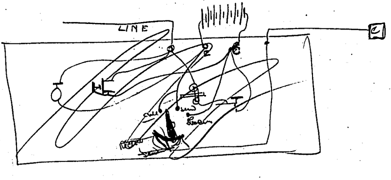

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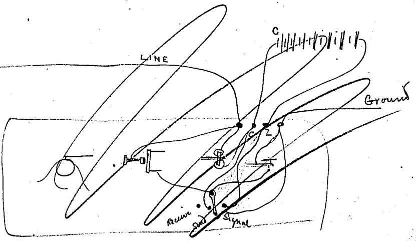
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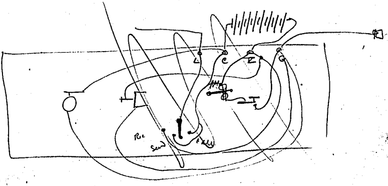
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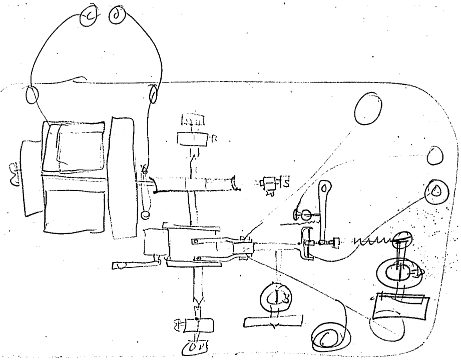

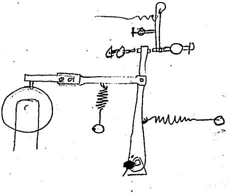

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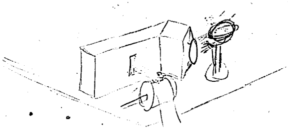

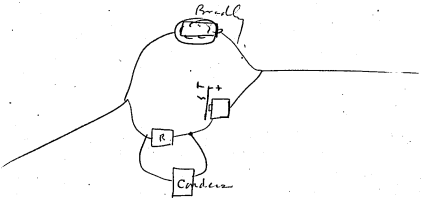
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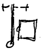

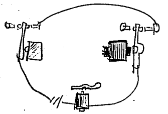

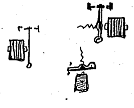

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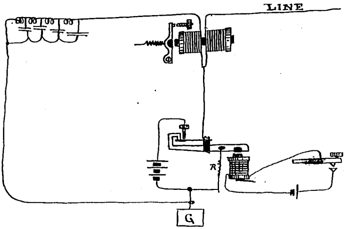

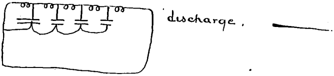
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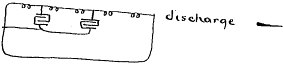
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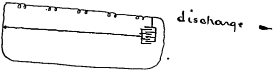
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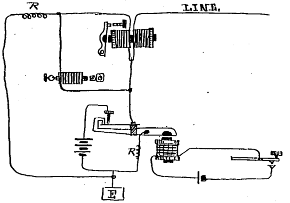
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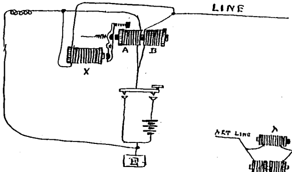
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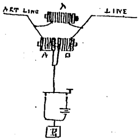
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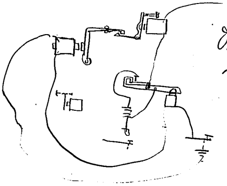

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Dup I guess
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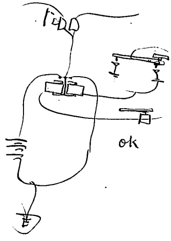

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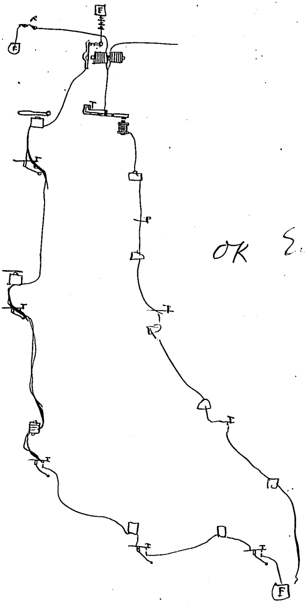
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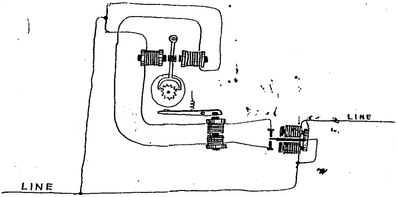
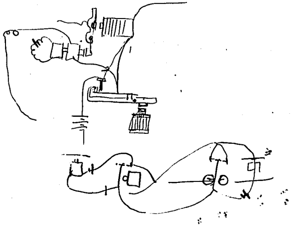


not polarized - Reverse currents



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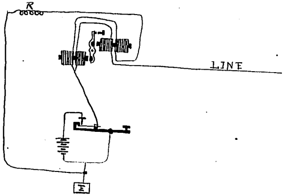
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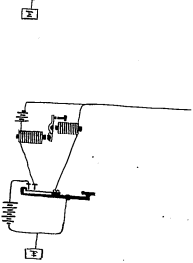
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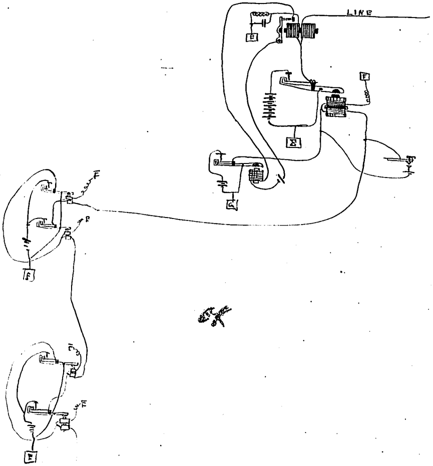
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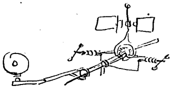

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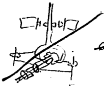

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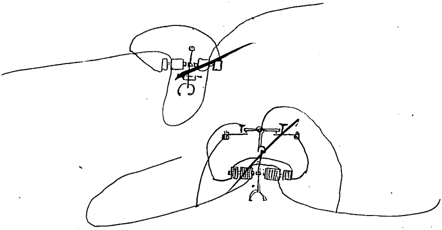

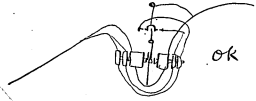

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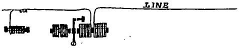

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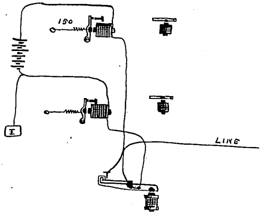
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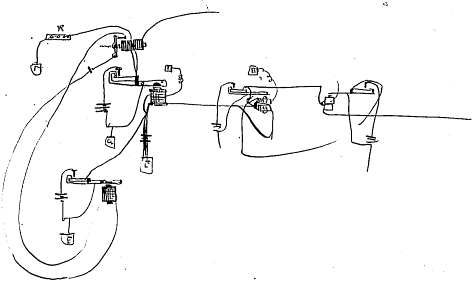
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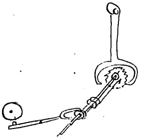
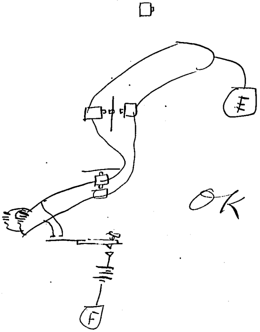
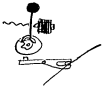
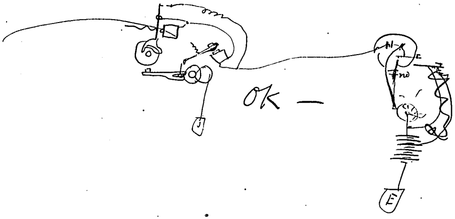


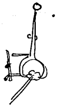


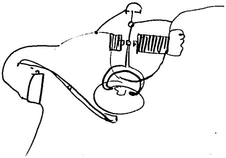
OK



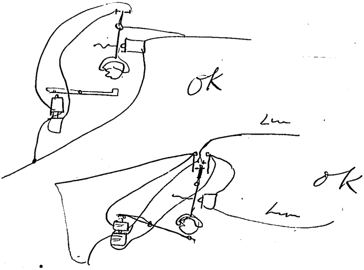


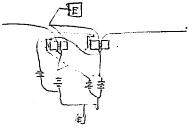
OK —



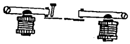


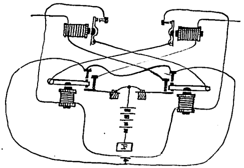
ok

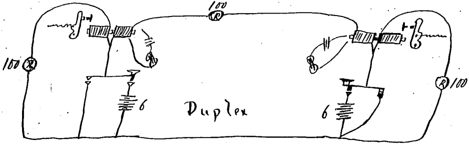




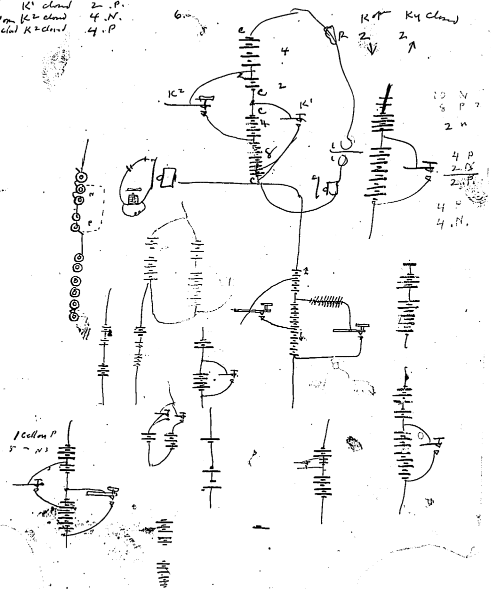
E
E




F

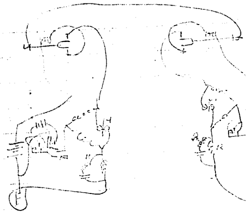

Duplex

both open 2 . N.
$K^1$ closed 2 . P.
$K^1$ open $K^2$ closed 4 . N.
$K^1$ closed $K^2$ closed . 4 . P

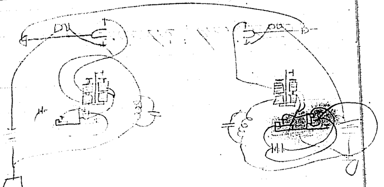

6
c
4
2
2
c
c
$K^2$
$K^1$
4
8
c
c
R
K open K4 closed
2 ↓
2 ↑
10 N
8 P ?
2 n
4 P
2 N
2 P
4 P
4 . N.
2
1 Cell on P
5 - N 3

Sextuplex

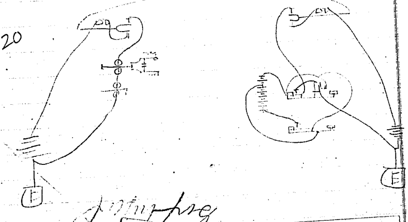
18



19



20

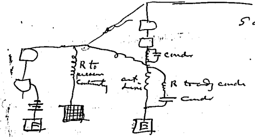


Acuerdo transferido

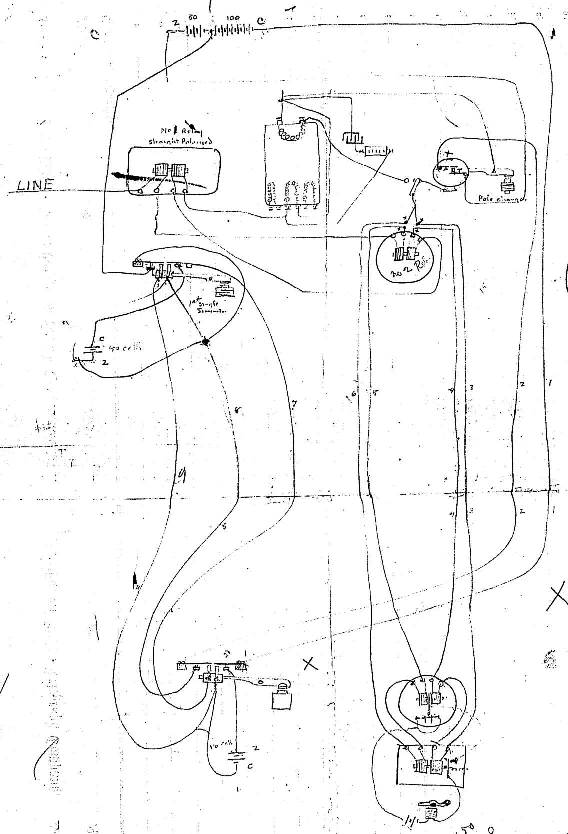
T. A. Edison,
10 & 12 WARD ST.,
NEWARK, N. J., 187

Send four sets of vibrations by opening & closing given battery
Send 4 more by increasing the battery
Send 4 more by slower vibrations
& polarized relays =

Duplex it thus


Line =
Cond
R to preserve continuity
art. Line
R to ready cond
Cond

Same at other end


Z
50
100
C
No 1 Relay
Straight Polarized
LINE
Pole changer
No 2 Relay
1st Single Transmitter
C
150 cells
Z
1
2
3
4
5
6
7
8
9
50 cells
Z
C

old wire out of x.

old wire out of battery on old single sender

Closes on 100 or 50
& opens on 150 or 0

Message No.

## The Western Union Telegraph Company,

*From* to

[NOTE.—Write five words on each line.]

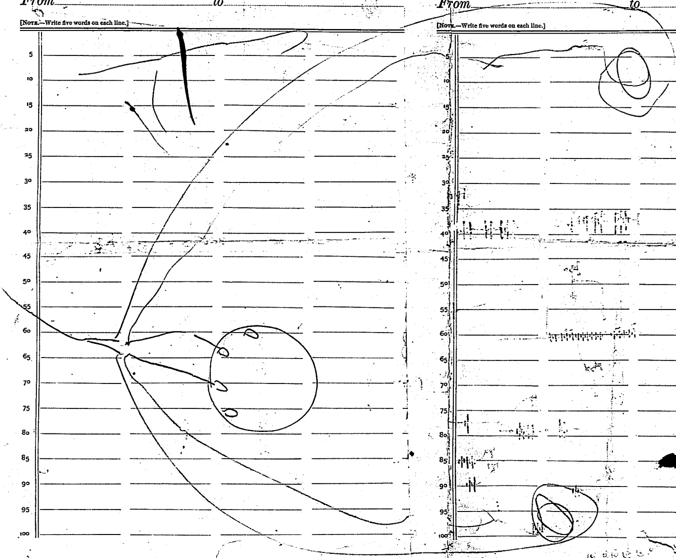
Message No.

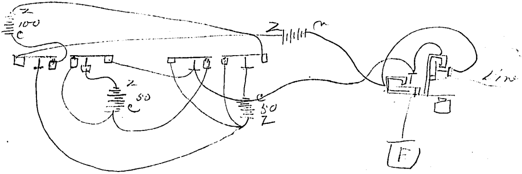
## The Western Union Telegraph Company,

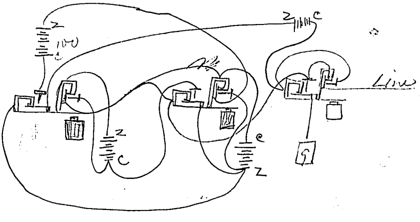
*Letter*

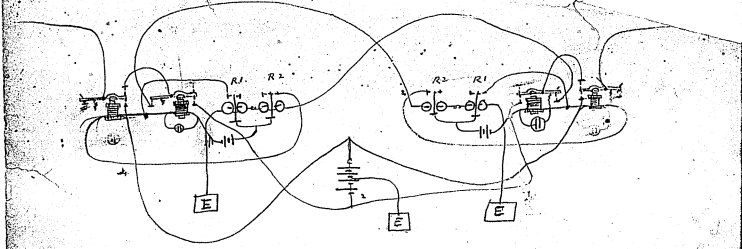
*From* to *Sheet*

[NOTE.—Write five words on each line.]

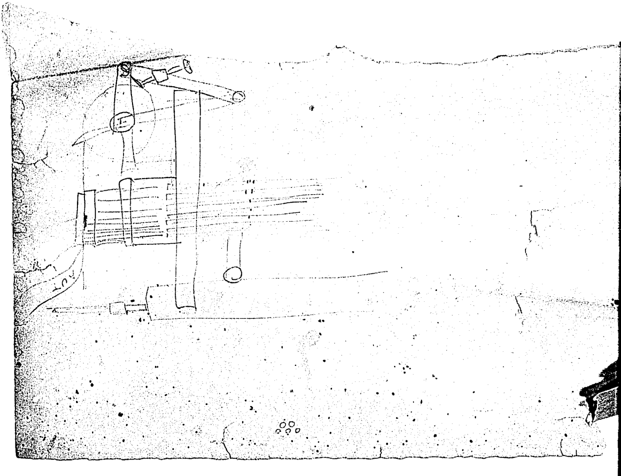


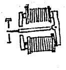

Z
100
C
Z
C
Z
50
C
C
50
Z
Line
F

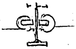

Z
100
C
Z
C
Line
Z
C
C
Z
G

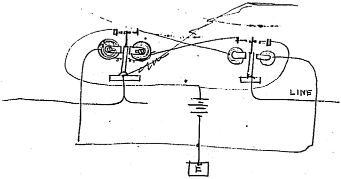

R1.
R2
R2
R1
E
E
E

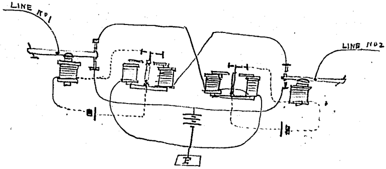
Duplex


AUT

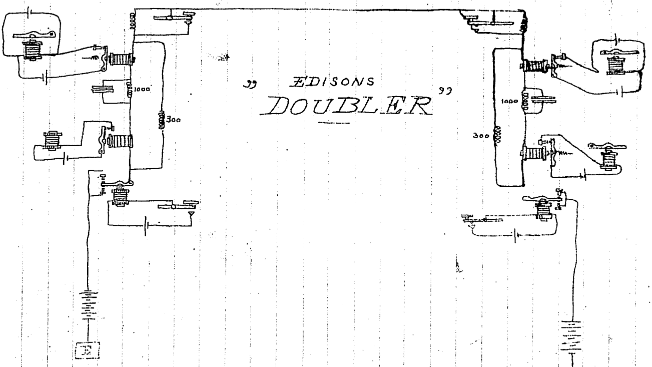





LINE
E


LINE No 1
LINE No 2
E

[redacted]



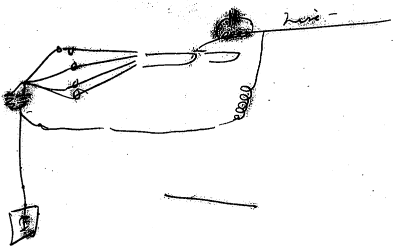
"EDISONS DOUBLER"

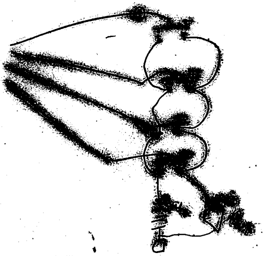
1000
300
E
1000
300
E

28

"Discharge Current,"

The thing is commencing to look like some Giant's sling — much loose forks;



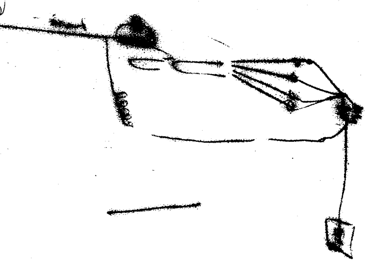


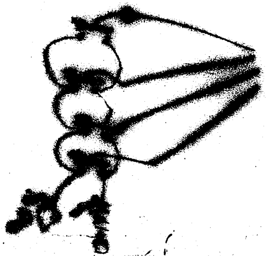
[illegible]

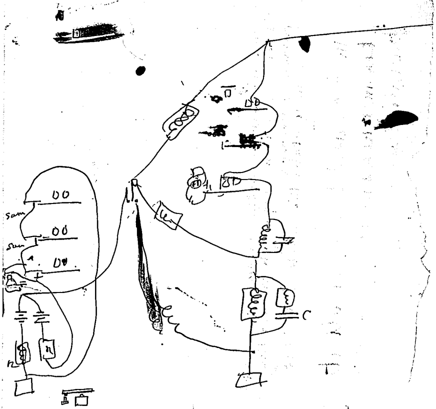
[illegible]

[illegible]

Alusite Mitt



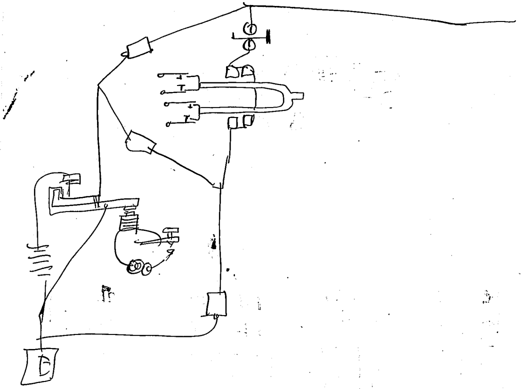



00
Sam
00
Sw
D0
R
C

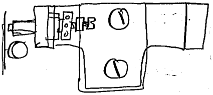
Acoustic Automatic

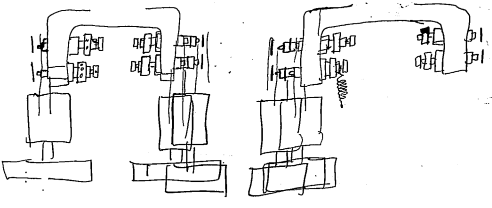
You w[illegible] notice in the package received several large iron rods which are for the purpose of securing to the back of the b[illegible] battery plates the whole of the rest

In the course of human events it becomes necessary to secure rights denied



James Adams





No 2 instrument

6 reeds, commencing thus

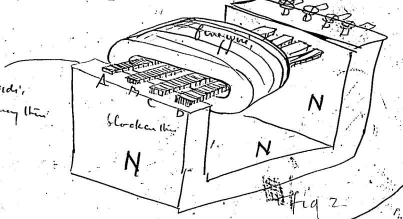
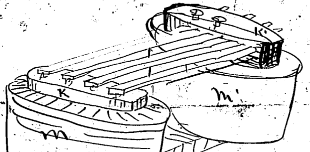

four wires
A
B
C
D
Stock on this
N
N
N

fig 2

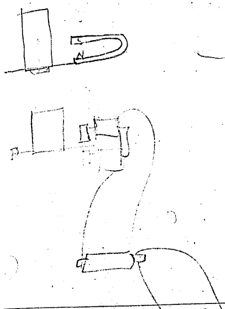
Fig. 3.

No 3 instrument

Comm

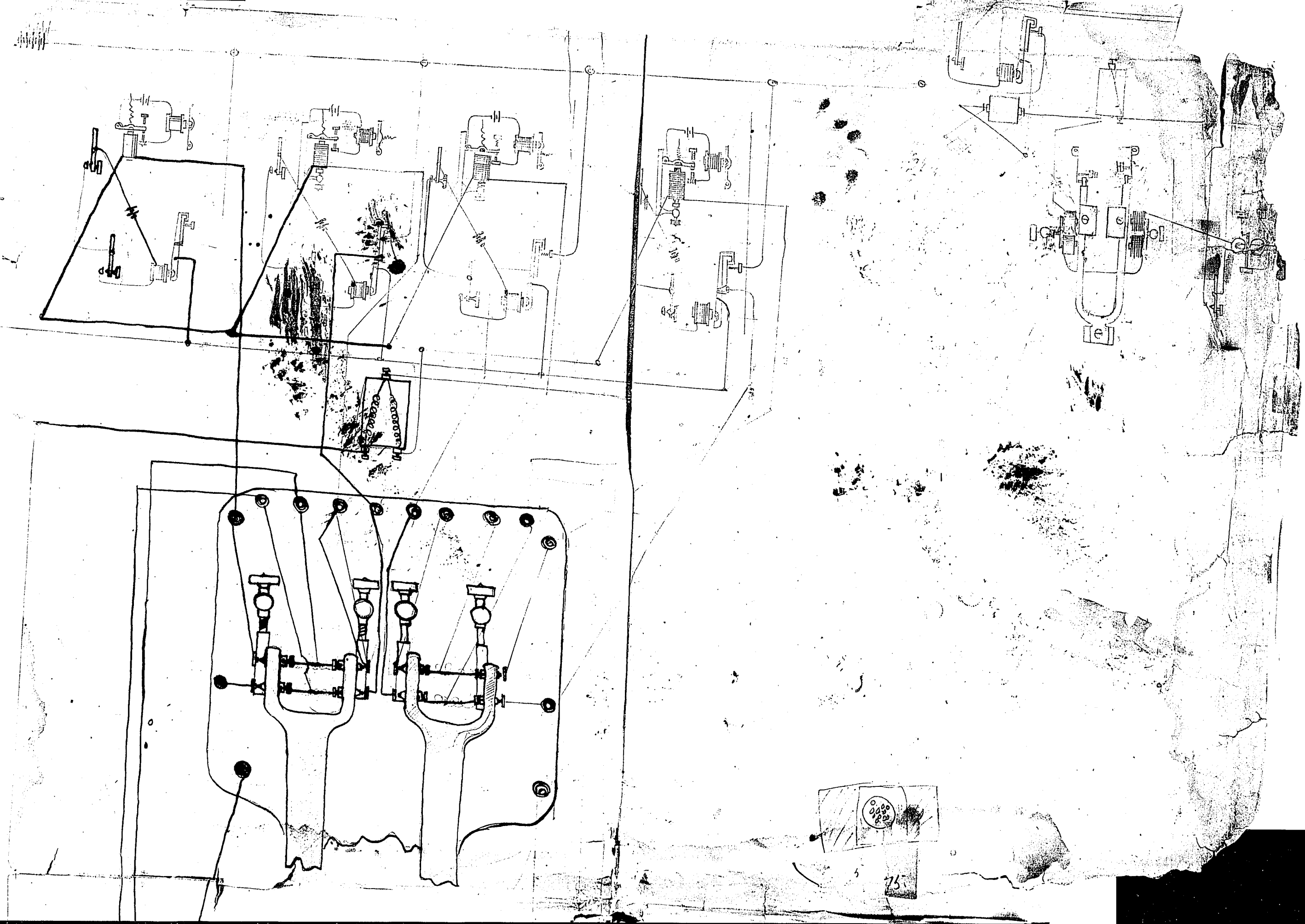


-E- acoustic Tel-arm plate, ②
Mag + Source electric
Energy —

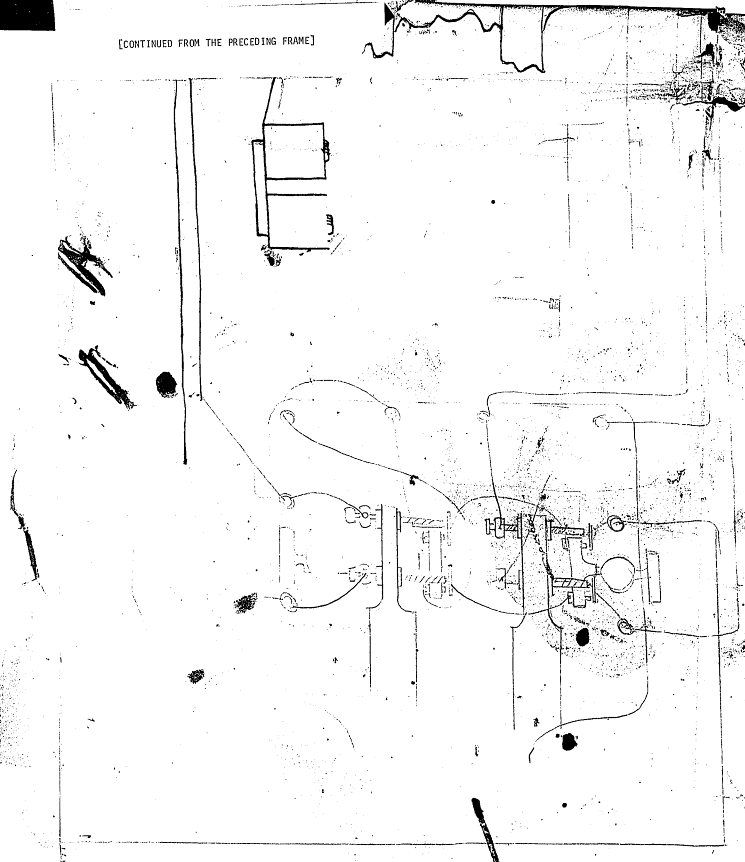


G — Recvr, Combn Mag. Dia
iron dia -

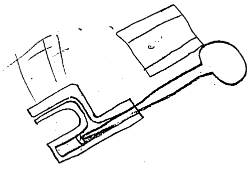
[CONTINUED ON THE NEXT FRAME]

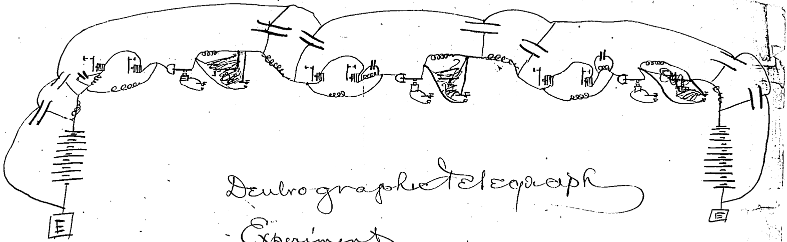


[CONTINUED FROM THE PRECEDING FRAME]



5
200
600
15'
$600 Hyd 6
$250 [illegible] 2.0

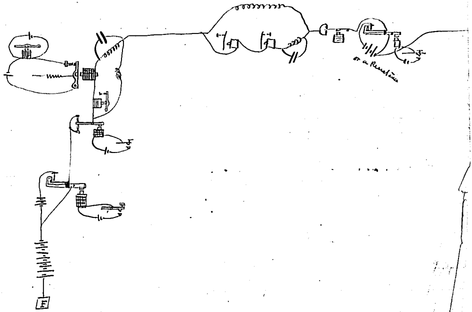




Deulrographic Telegraph

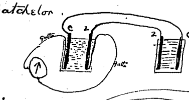
Experiment

With Static Devices


or a Resistance
F

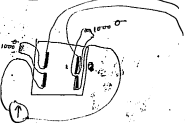
Railway Double Telegraph
"Deulograph"

Batchelor.


C
2
2
gutta
gutta

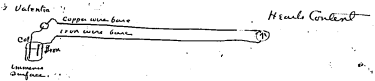
carbon dilute Bi[illegible]ate potash

also


1000 Ω
1000 Ω
1

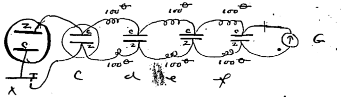
same [illegible] as above

Idea.


Valentia
Copper wire bare
Iron wire bare
Col
Iron
immense surface
Hearts Content

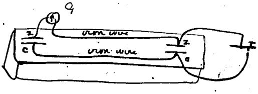
Cable forms battery, which when ~~open~~ opposed by artificial battery at Valencia, gives no Current at Heart's Content, but when disconnected at Valentia, forms an immense cell worth of 1 Cup Electromforce

Batch



Z
C
100Ω
100Ω
100Ω
100Ω
100Ω
100Ω
c
z
G
X
C
d
e
f

If you Can get signals through to the Gal G by working the Key X then we Can Telegh over The Atlantic Ocean with bare wires. get batteries C D E & f as near alike as possible. use Carbon batteries that give same deflection on Bradley No. 4.

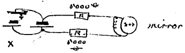


g
iron wire
iron wire
Z
C
z
c

Trough filled with saturated Solution Chl Sodium,

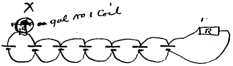
if closing Key we move g then we Can work through Ocean with bare wires

Experiment. 1


5000Ω
R
R
5000
Ω
mirror
X

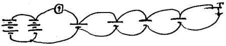
Ascertain if adding the second battery X will increase the deflection of the mirror if not am afraid we are gone up on the bare Earth Line,

Experiment 2.

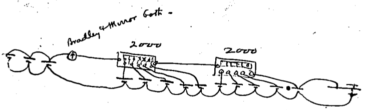

X
gal no 1 Coil
R

insert Bradley Galvanometer at X. and put 10.000 Ohms and see if get any deflection, only then reduce R till get deflection

Expmt 3 =

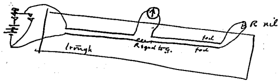


Experiment 5 same as 2.

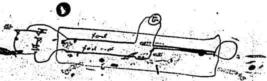

Bradley & Mirror both -
2000
2000

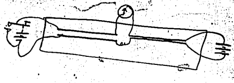
If this works Mirror well then Bare wire is probably OK =

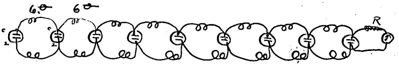
Experiment 5


R nil
foil
trough
Regd to G.
foil

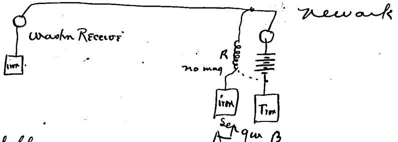
also


foil
foil rod





6 ohms between Each see ~~cotas~~ what R can be passed with 6 ohms between Each & nothing between Each,

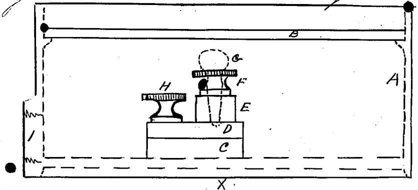

Washn Receiver
iron
Newark
R
no mag
iron
Iron
Sep
A
gnd
B

See deffrence =
Then dotted Line,
also try a zinc gnd in place A,

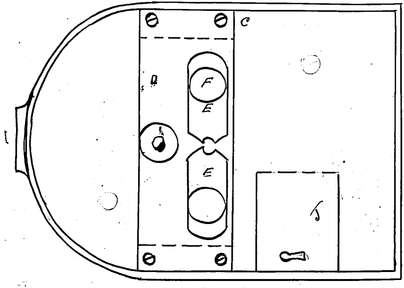
# New Test box for The Domestic Telegraph Co

One of main objects is to keep water out.

The box as will be seen is let in at X so that if water gets behind it cannot get inside. The door also goes in

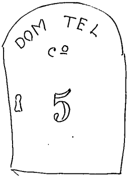


nearly 1/2 inch. The blocks E are placed



on Hard Rubber piece D which is isolated from the box by lugs C cast in box so that there is about 5/16 of an inch between rubber & box. The wires are fastened under blocks & the screws F are loose simply for holding the testing wire

T is a lock & not a Yale at that.
There must be a gas pipe thread a I & a pipe at least 4 feet long & 7/8 of an inch thick outside screwed in.
The door must be cast with these lette on & the number of box letters about 3/8 long & figures 7/8 or 1 inch

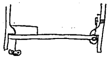


There must be 2 holes inside to fasten it to a board!

The boxes must be Black Japanned & the work inside have a thick coat of lacquer although it is not necessary to polish any thing inside

There must be 2 Keys to each lock.
Plugs must have a hard rubber head on & blocks must be screwed down well so that it will not mov with continual putting in of plug

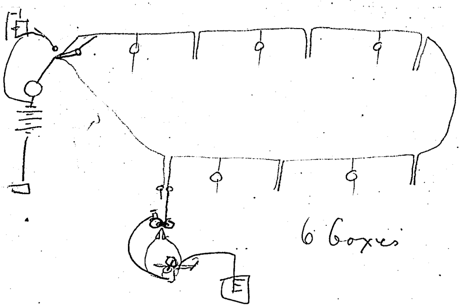
The door of box must be hinged in this manner



THE ATLANTIC & PACIFIC TELEGRAPH CO.

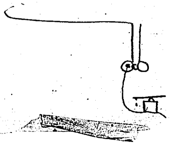
PRESS. BY TELEGRAPH FROM

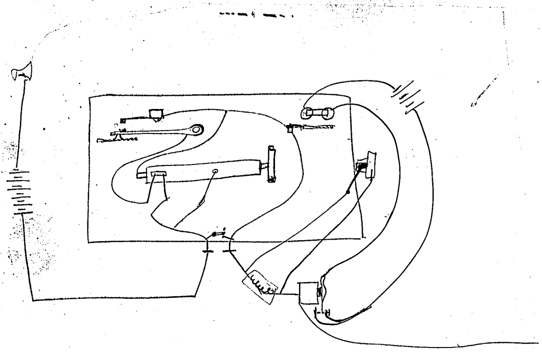
Sheet No. Letter



6 boxes

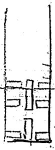
Domestic

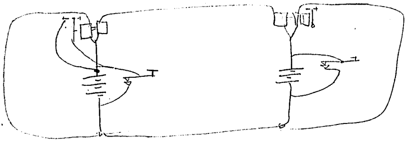


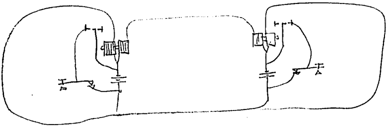


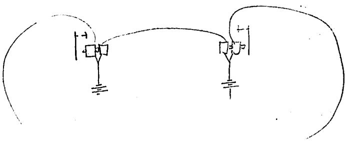
9 Clamps
2 large Clamps

| | |
|---|---|
| 1 Dode plane | 1.85 |
| 1 Hammer | .60 |
| 1 Jennings Bit | 1.00 |
| | 3.45 |







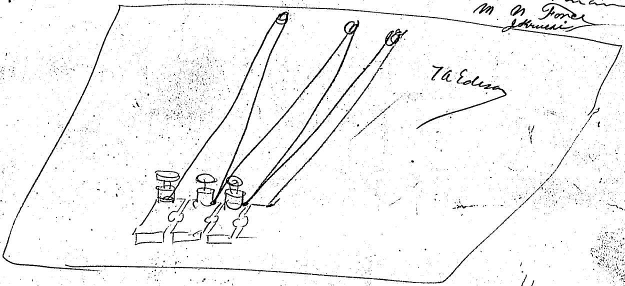


Scrapbook

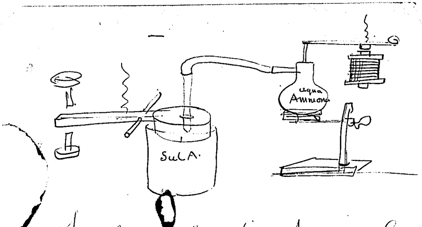
Martin Make Resistance for Experiment 1/4 ohm each

Nov 4

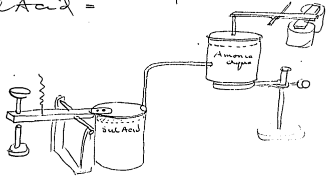
Chas Batchelor
G E Carman
M N Force
J Kruesi



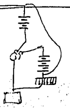
TA Edison

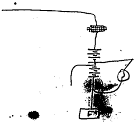

aqua
Ammonia
Sul A.

Sounder worked by Ammonia Gas on Sul Acid =


Amonia
Aqua
Sul Acid

use sending shunt on English. P.O. Battery but instead of plain & mag use a 1500 ohm Relay mag





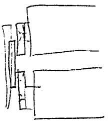
2000 4
2000
1000

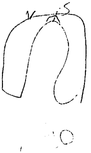
2000 4
2000
1000 8

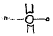
1000
1000
500 Total
total 2 spools 250 each

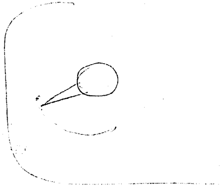
Have JCR order from Bradley
~~two~~ ~~four~~ Relay Spools
two.. 3 inches Long Each 1000 ohms
two 6 inch Long " 1000 ohms.
and ~~10~~8 3 inches long exactly 1000 Oh
250 ohms ~~1000 ohms~~
and 2 3 inch " "

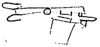
It is probable that a single cell generates the ~~wa~~ its electricity in waves following each other with great rapidity. and that in consequence of static induction even upon bodies at great distance from the cell ~~itself~~ or even the cell itself the time between the waves is bridged over by the static charge although we are unable as yet to isolate as far far from all bodies & determine by instrumentia the ~~ext~~ existence of these waves an obvious inference of the Existence can be drawn from the fact that ~~a Current~~ waves intermitted by a telegh key when transmitted through a long Conductor close to surrounding bodies ~~that~~ these waves are continuous when made rapidly if on the Atlantic Cable an Operator should key at the rate of ~~(twenty~~ forty ~~four~~ words per minute the current at the receiving station would be continuous i.e after the first word ~~the instrument lever~~ or galvanometer needle would deflect to a certain

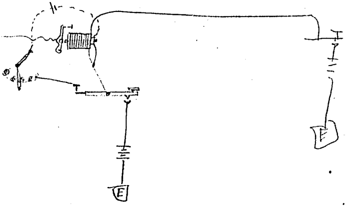


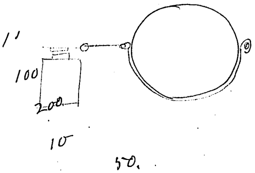

V
S



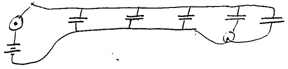


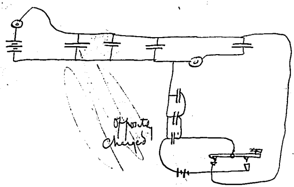


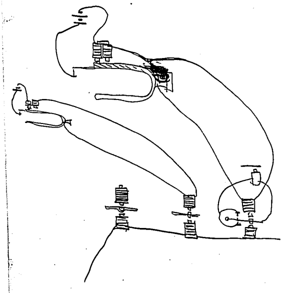

E
E


11
100
200
10
50.

3


No good


Oppositely charged



Blank No. 2.

# THE WESTERN UNION TELEGRAPH COMPANY.

## ALL MESSAGES TAKEN BY THIS COMPANY SUBJECT TO THE FOLLOWING TERMS:

To guard against mistakes, the sender of a message should order it REPEATED; that is, telegraphed back to the originating office. For repeating, one half the regular rate is charged in addition. And it is agreed between the sender of the following message and this Company, that said Company shall not be liable for mistakes or delays in the transmission or delivery, or for non-delivery, of any UNREPEATED message beyond the amount received for sending the same; nor for mistakes or delays in the transmission or delivery, or for non-delivery, of any REPEATED message beyond fifty times the sum received for sending the same, unless specially insured; nor in any case for delays arising from unavoidable interruption in the working of their lines, or for errors in cipher or obscure messages. And this Company is hereby made the agents of the sender, without liability, to forward any message over the lines of any other Company when necessary to reach its destination.

Correctness in the transmission of messages to any point on the lines of this Company, can be insured by contract in writing, stating agreed amount of risk, and payment of premium thereon at the following rates, in addition to the usual charge for repeated messages, viz: one per cent. for any distance not exceeding 1,000 miles, and two per cent. for any greater distance. No employee of the Company is authorized to vary the foregoing.

The Company will not be liable for damages in any case where the claim is not presented in writing within sixty days after sending the message.

GEO. H. MUMFORD, Secretary.

WILLIAM ORTON, President.

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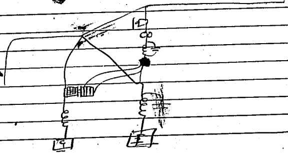
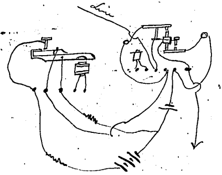
*Send the following Message subject to the above terms which are agreed to.*

*To*

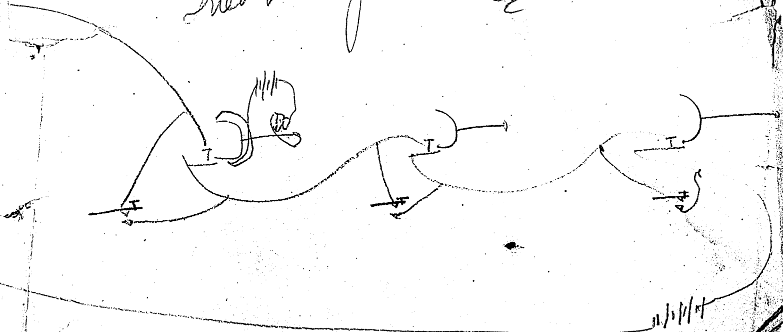


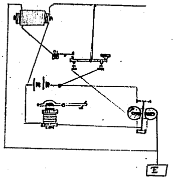
4 Double pointed Sounders.
4 Repeating sounders ✓
4 Regular sounders
8 Keys Regular
4 backpointed ~~Keys~~ Relays ✓
4 Regular Relays ✓
4 Condensers 2 or 3 mf capacity ✓
4 boxes with 3 coils in. Quad boxes will answer. ✓
Local batteries & Main batteries

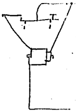
(X-E-1684)

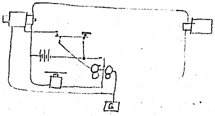


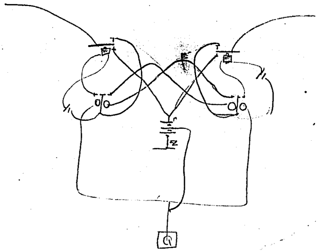
Tried this Jan 10th Ott

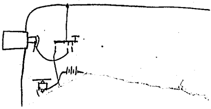



E

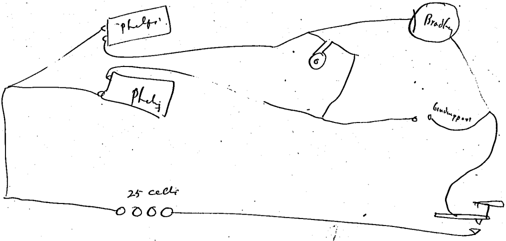

T

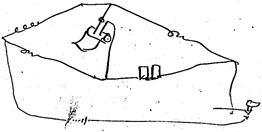

G


E
Z
G

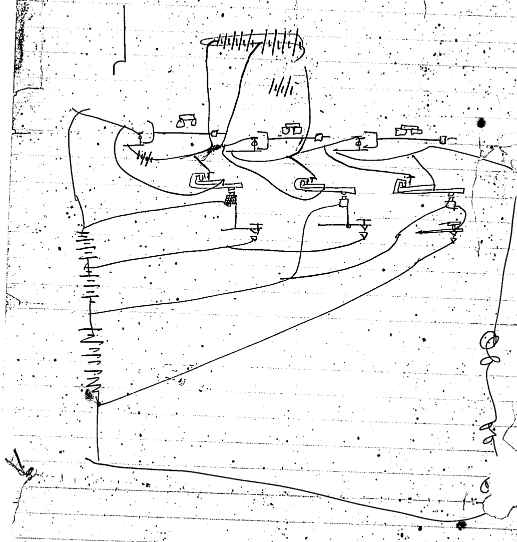


James Adams


Phelps
Phelps
Bradley
Binding post
25 cells



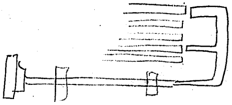
Quarantine of Marine



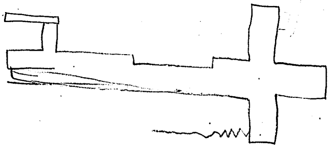
Long's drawings paper feed Caveat
filed March 8. 1871 Dated Mch 7-71
Scott Caveat feby 17. 71 filed-

Gyroscan Count Apl 6 1870

Graces Key & Sellecti



Graces says 13 levers will be used that being necessary to form a light letter - this 6 an



Drawings and
Discriptions

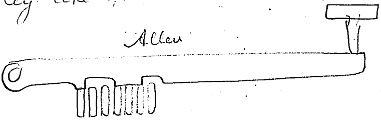
The principle of Ohlworth Machine is similar to the Grace machine insomuch as both have moveable levers which are moved by the Key levers to form dies, There are 9. Longitudinal Sliding levers which operate the punches worked by 9 Keys of the Key board. There are nine Reciprocating levers also worked by the 9 Keys of the Key Board.

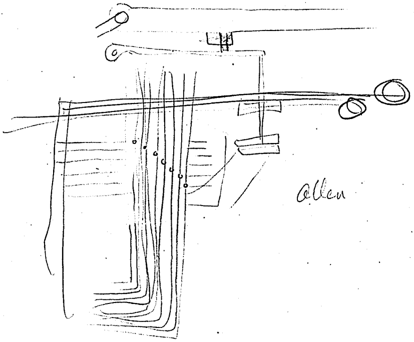
The Operation of the machine is precisely like the Grace Machine with the Exception That there are no Selectors, ~~[illegible]~~ one Key is depressed to perforate the letter T Y E but two must be depressed to punch letter M N, O etc, Grace has Selectors on his Key levers —

Both use adjustable moveable dies,

'Allen Machine' has its selectors on the Key like grace =

'Allen'

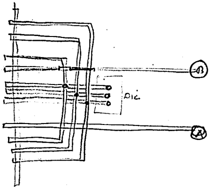


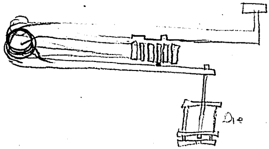


Allen

Longitudinal Sliding Bars are in Whitworth, & practically in Allen's

Thus Allen:





Dated Sept 26,
filed Oct 28

Shows his present Brac
Sub with power motion

Lon.

Cotton + produce not go down.
(Phelps') Reversals + stop to print

No of Lines this kind, 17. greatest number on any one line. 28, number of Daniels (?) Cells used 12 per inst. which allows for line + all, all separate battery worked direct from break wheels: Total number of instruments 284. but one line has one instrument is going to be increased - shortest working circuit outside this about 10, This battery is in W.U. Battery room.

Small thinks Manhattans will work from here, works direct break, wkes same as phelps, - No of ckts 18, Longest ckt (10) greatest no of insts on ckt 45. 183 carbon cells on that circuit abt 4 cells per inst, shortest ckt, 43 cells - 7 insts.

---

Motor battery big Phelps' 1/16 ohm internal, Bunsen; have generally 2 cells each,

have 1/2 doz ordinary 2 cell Locals no Manhattan + Phelps.

one big bat on Cotton 1 on Ch produce 1 on NY Produce down at Broad,

Manhattan has 2 or 3 Locals of 20 cells each Carbon -

---

[illegible]

3 wire Stocks

Stock ckts, No 51,
~~No of [illegible]~~
51 Relays. 6 ohms, total 306, no cells 80 carbon cells. ~~2 or 3~~ 2 motor batteries, No of Morse Lines 12, all give about 80 volts,

All 3 wire stocks worked with up + down stroke, Small thinks there is nearly an ampere in each printer which when printing + type are closed at once is 1/2 ampere.

---

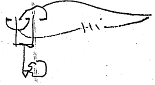
Resis of phelps 30 ohms 12 cells
Manhattan 13 ohms 5 carbon
all magnets in one ckt,

Following is no cells on ~~Phelps~~ Manhattan Old Each ckt,

| Ckts | Cells | Insts. | Phelps |
|---|---|---|---|
| 1 | 99 | 17 | |
| 2 | 118 | 14 | |
| 3 | 126 | 25 | |
| 4 | 144 | 24 | |
| 5 | 149 | 24 | |
| 6 | 105 | 16 | |
| 7 | 78 | 5 | |
| 8 | 43 | 7 | |
| Financial | | | |
| 1 | 141 | 35 | |
| 2 | 97 | 22 | |
| 3 | 143 | 35 | |
| 4 | 133 | 29 | |
| 5 | 120 | 30 | |
| 6 | 137 | 31 | |
| 7 | 53 | 12 | |
| 8 | 137 | 33 | |
| 9 | 183 | 45 | |
| 10 | 143 | 37 | |
| | 2156 | | |

( [illegible] )

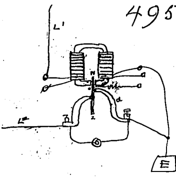
Manhattan + Phelps
not like Scott =



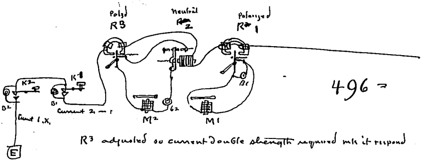
Phelps short ckts –
[illegible] but
[illegible] in [illegible] [illegible]
stop spkg – Manhattan
dont short ckt –

Bosscha

495



836
Prescott says: 1st pp'. something dif from what the app appears to be it appears to be a transmitter


Polzd
RB
neutral
R 2
Polarized
R 1
K2
K1
B2
B1
Current 2, — 1
Cunt 1.X.
M2
M1
62
B1
E

496 =

R3 adjusted so current double strength required mk it respond

Both Keys closed sends Neg current 1. No 1 Key Current 2 negative

No 2 Key Current 1 positive

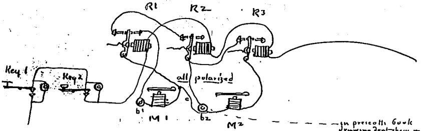
Key .1. alone closes all Relays, but M1 only responds

Key 2 alone sends positive current .1. R2 closes. M2 closes. this current dont effect other relays

Both Keys closed. current neg strength .1. this operates R1 & R2 both M1 M2 closes = Prescott says this rangmt defective Cos' rev currents entire pass tho neutral relay vibrate.

Bosscha

afterwards Bosscha invented 497, to do way with defect this reversing —



R1
R2
R3
Key 1
Key 2
all polarized
b1
M 1
c
b2
M2

Key 1. 2 negative. Key 2 1 positive both 1 negative

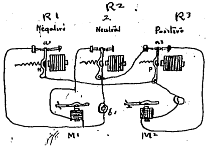
In prescotts book drawing dont show on which side wire c should be of battery runs thus

Key 1. Causes $R^1$ $R^3$ close + close $M^1$. 2nd Key causes R2 alone respond both $R^1$ + $R^3$ being opp polarity hence M2 alone effected; both Keys closed cause $R_1$ alone respond [illegible] both M1 M2 [illegible] b1 [illegible] b2

Reo + McC + ALC
1960
of
1862

Quadruplex
Drawings

# Kreamer


R2
R1
2.
R3
Negative
Neutral
Positive
a¹
a³
N
P
b¹
M¹
M²

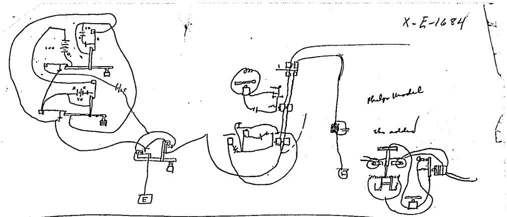
open no current = ~~all~~ open M¹ M² open former by short ckt latter ~~by~~ directly =

1 Key closed negative Current strength 1. sent R¹ responds; shtckt removed. M¹ closed =

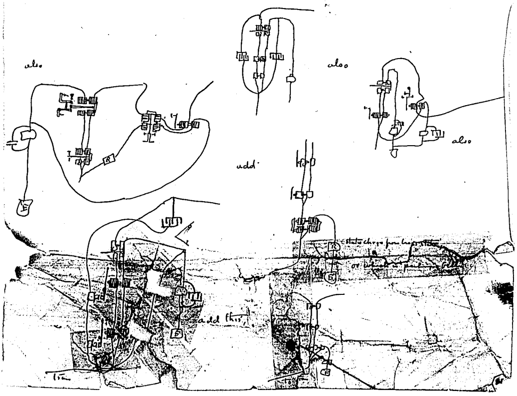
2nd Key closed. P current sent strength 2. R2 + R³ close M² closes.

Both closed P current strength 1. causes R³ only close. that closes both M² + M¹ former directly latter by removal short circuit =

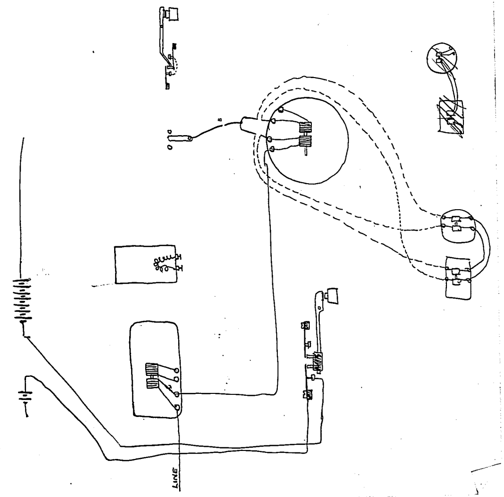
X-E-1684

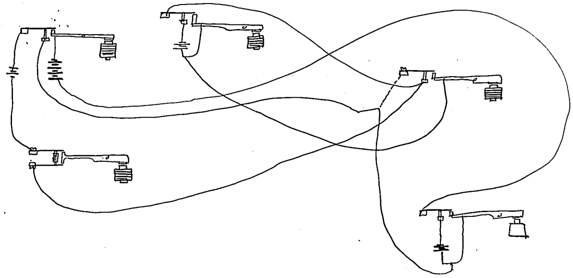

Phelps model
this added
E

in above Application put in this.

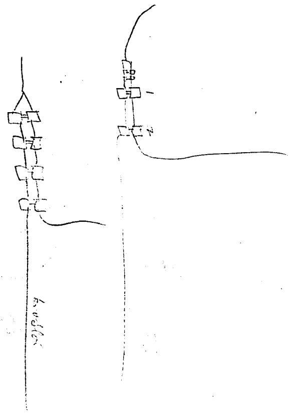

also
also
also
add
R
add this
Static charges from high station
or [illegible]
E

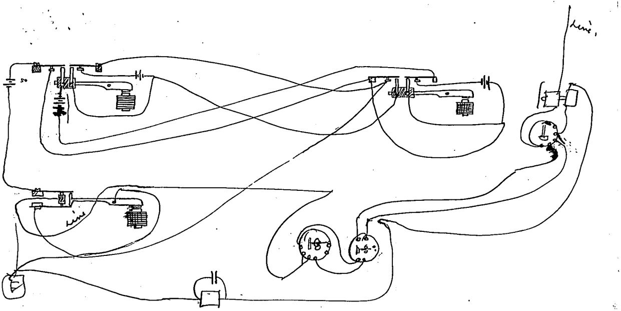
X-E-1684

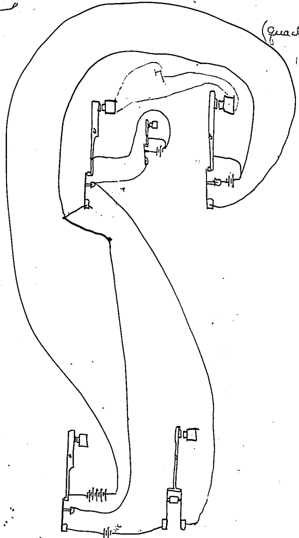




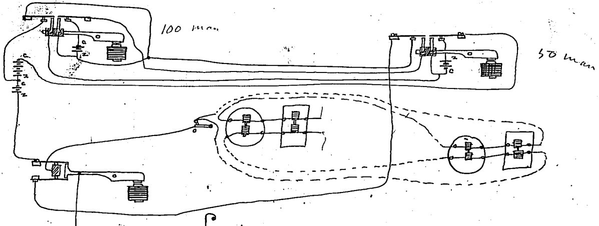
X-E-1684

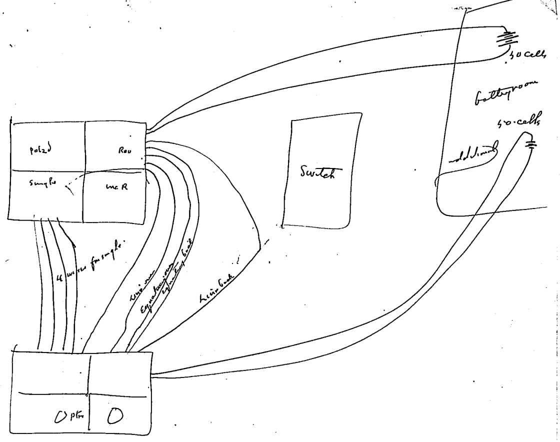



Line,
Line

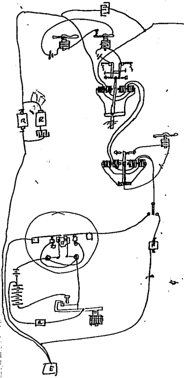


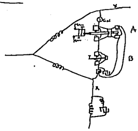
(Quadruplex X-E-1684
1877)


100 man
50 man
Connect
F

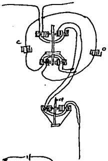

50 cells
battery room
50 cells
additional
polzd
Rev
Simple
inc R
Switch
4 wires for simple
Line one
Equatorial one
Equatorial back
Line back
O ptr
O

German Quadruplex:



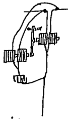


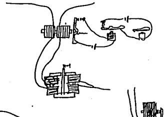
Mention A may be a bridge & B worked differentially by allowing X & Y. to pass through it double coils.

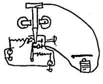


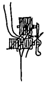
Do considerable describing thus dispensing with diagrams:

Mention repeater generally how it works;

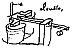


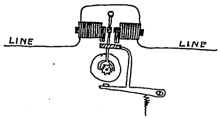






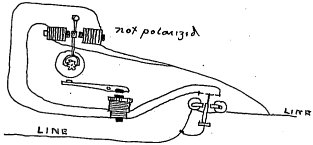
if can get more in Elaborate more





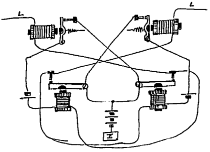
Smith No 3.

Reversed Current. No electromagnet. for printing


not polarized
LINE
LINE

Smith No 4 —

Reversed Currents,



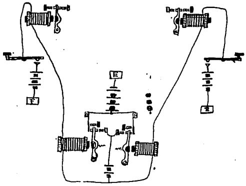
~~Cant~~

Will it work

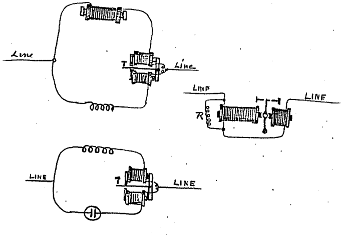
Speeds Repeater

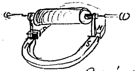
— Kafter 4 45

## Hrischens Morse system with repeater,



## Relays worked by magnet induction,

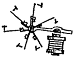

Line
T
Line
LINE
R
LINE
LINE
T
LINE



guess its only

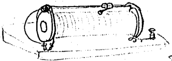
Bréquet polarized Rely
Dub 383

get Farmers Duplex

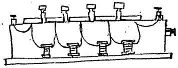


Phelps Multiplex
Circuit breaker

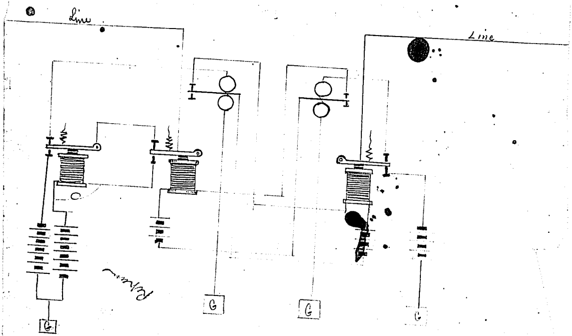
Replaced by Clockwork.



Jacobi's Rheo.



Siemens Rheostat

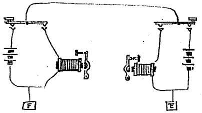

Line
Line
Relays
G
G
G
G

Varleys Method

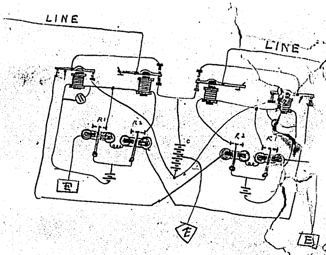
Translation between single + double currents

Culley 235

Simple Morse Circuit European.



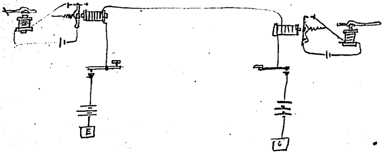
Sabine 85-


LINE
LINE
R1
R2
C
R2
R1
E
E
E

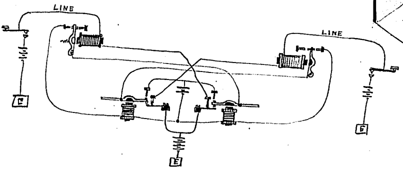
Varleys: Double: current Repeater

Sabine 149

Frischens plan for
work closed circuits

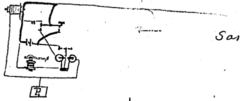


Frischen Morse-system with
Repeater


LINE
LINE
E
E
E

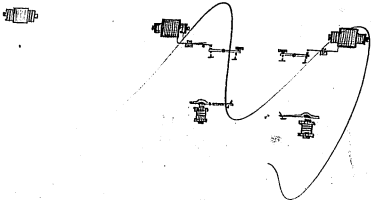
Sabine, page 151.

Siemens system
Working by induction Current

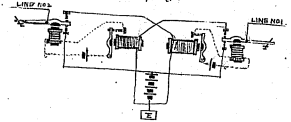


Same here

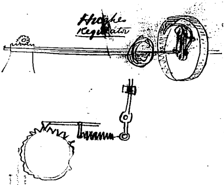
Sabine · 135



English Translation
No. 1.

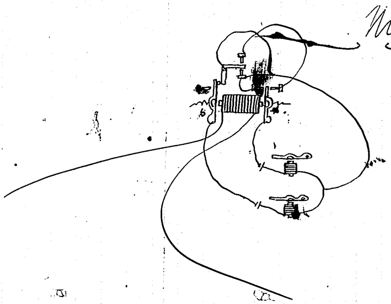

LINE NO 2
LINE NO 1
E

# Regulators and Synchronism


Hughes
Regulator

Phelps regulates ~~his~~ Electro Motor by Platina faced wheel running in oil with screw bearing on same.

Nickelson



Light & heavy

1 Key P. 1 Key N

both Keys and Strong P & N
which ever it is

T A Edison

Chas Batchelor

Caveat.
Repeating from
Inkmarks — not
prepared

The object of this invention is to transmit of ordinary handwriting over telegraphic wires from manuscript written in ordinary or special ink, and recording the same on Chemically prepared paper.

The invention consists in arranging a number of levers the ends of which are provided with fine smooth points over a drum Carrying a continuous strip of ordinary writing paper, and so arranging these lever that they bear with Considerable down upon the smooth paper but no sufficiently to obtain Enough friction ~~to overcome the~~ to Carry them in the direction in which the drum revolves or overcome the retractile force of a spiral Spring which tends to give the lever a motion Contrary to the direction which the drum revolves and the action of which spring tends to keep said levers against a fixed point when no writing is passing under them, Immediately Opposite these levers are contact points, all connected to the same pole of the transmitting battery, and arranged in such a manner that should the friction of the paper be increased in any manner ~~it would be~~ sufficient to overcomes the retractile power of the spring that the lever would be carried forward by the revolving drum and come in contact with this circuit closing point, The ink supplies this extra friction, When the clear paper is passing under the point connected to the lever the friction as stated before is insufficient to carry the lever forward, but when an ink mark comes in

Contact with this point the friction is at once so increased that the point is locked to the paper ~~to~~ so to speak and Carried forward to the front point closing the Circuit a for such a length of time as is proportionate to the length of the ink mark, It is not necessary that the ink mark should be in relief or that it should be of great depth, but the mere ink stain on the paper is sufficient to greatly change the smoothness of its surface and produce this ~~friction~~ extra friction,

If a special ink is used it can be made to increase the friction or decrease it the latter Effect being obtained by putting an acid in it =.

figure 1 shows one single Lever operated by the ink marks, Top view

4 ink

Fig 1.

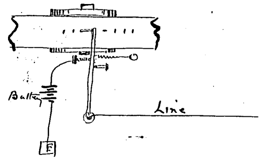
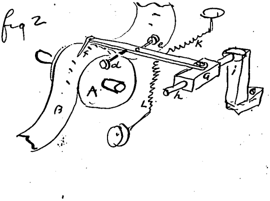

Battery
Line
F

Figure 2 shows it in perspective.

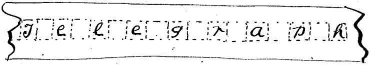
fig 2


f
e
K
d
A
g
h
i
B
L

A is the continuously revolving drum
B is the paper with ink marks upon it,
C is the moveable lever provided
with the sharp point f. held
tightly in Contact with the paper

6 ink

fig 3



The dotted lines are light tracing used for the purpose of ~~dividing~~ seperating the letters from each by intervals of space so that they may be transmitted with four wires,

figure 4 shows the arrangement

Scrap Book

Roman Letter printer

(Electromotograph (?) 1874)

No magnet or armature, ~~is used the~~ or coiled wire is used

This apparatus is based upon the fact discovered by Mr Edison that electricity ~~by peculiar~~ may be conv[illegible] ~~the equivalent of~~ ~~mechanical~~ motion by Electrochemical decomposition,

The apparatus consists of a lever ~~provided~~ with a point, resting upon a strip of paper moistened in a chemical solution. This paper is moved slowly by clockwork, The normal friction of the paper carries the lever to the left by ~~with the~~ when a current ~~from~~ the line is in ~~passing thro~~ through the lead point and paper to the earth, it ~~and in its passage through the paper~~ converts ~~that paper~~ portion of the pap immediately under the point by a peculiar chemical reaction into another ~~Chemical Compound~~ substance ~~of a more~~ which acts as a lubricant, and the lever is quickly moved to the right by a retractile spring.

# Roman Letter Chemical Telegraph Caveat

The object of this Invention is to transmit & receive & record Roman Letters the first of which is done by Roman Letters perforated in strips of paper of which a patent has already been applied and the latter Recording on chemically prepared paper by electric decomposition the letters so perforated. Several methods have been already described in a previous Caveat whereby this may be accomplished on two or more Wires,

The present invention Consists of mechanical devices as well as Electrical devices for operating it upon one wire,

The main feature of which is to send half of the roman letter over the wire from the perforated paper with Positive & negative Currents One per both of the transmitter & receiver being set one line of perforation (forming a letter) ahead of the other, and by a director, Commutator or Circuit changer Connected with

The Receiving instrument. throw the line over on another set of recording pens & record the balance of the letter, The Circuit Changer is Controlled by a sensitive Electromagnet provided with a lever which hold & release an Escape ratchet wheel at the beginning of every letter, Each letter of the perforated paper is formed of small holes; at the Commencement of Each letter & right below it is a large perforation which has a separate Contact roller by itself & when no other roller is through a small hole passes through this Large hole & puts a strong Current of three times the duration of the Currents transmitted from the perforation forming the letter this wave actuates the magnet at the distant Station for an instant when its lever is drawn away from the Escape wheel allowing the circuit Changer to revolve one 1 tooth

This Circuit Changer in revolving
one tooth first Connects the
Line & Earth wire first to two
recording pens (the last ones)
when this has formed half of
The Letter the Circuit Changing
which is still revolving ~~to~~
"disconnects the line & Earth
from the back pens & throws
it on the first two pens until
the other half of the Letter
is formed at this moment the
circuit changer is arrested by
the Lever of the Electromagnet
Coming in Contact with One
of the teeth of the Escape
Wheel, It now lays still till
another large hole before a
Letter passes under the Extra
Marking pen at the Receiving
Station when another wave
is sent & another letter is
printed, Thus by sending
an Extra wave before each

Letter to regulate the recording mechanism & change from one letter to another perfect synchronism is unnecessary & the whole time of the wire is utilized to make the Letter, or in other words Positive followed immediately by a negative forms half of the letter & immediately the wire is thrown over on a new set of recording pens where the same action takes place. Thus Keeping the wire Constantly at work. The peculiar manner in which the letters must be formed gives its own spacing without ceasing sending Currents over the wire to give a space as is usual, figure One 1 shows the arrangement of the Contact rollers at the Sending Station, fig 1

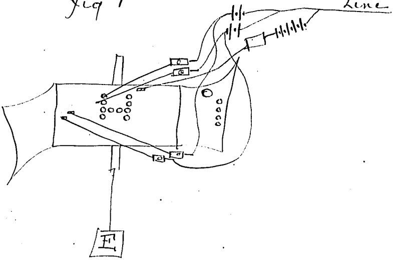
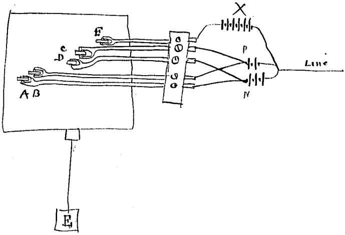


fig 2


X
E
C
D
A B
P
N
Line
E

In forming a Letter first E Comes in Contact with the Drum through the Large hole putting Large Battery X to Line & Earth & sending a strong current over the line which actuating the Electromagnet sets the circuit changer in motion. (when the circuit changer is arrested the Line is not in Connection with Either set of pens) as the Letter passes along the top passes under C sending a P to Line then D. sending a Ne Co Line & so until till the whole of the letter has passed under C & D, the Lower portion of the letter now Comes in Contact with A B. which act precisely as C & D. after the letter has passed under both by that time the circuit Changer at the distant End is arrested, Another Large hole passes under E setting the Changer at the distant End going & another letter is recorded, The perforated Letters are separated from Each other the distance of the room taken up by the

Largest letter of the alphabet - and a little more. The Extra space being used for the Large hole: I do not wish to Confine myself to regulating the distant Circuit changer at every letter as the large hole may be used only between words, providing the transmitting & Receiving run nearly synchronously Neither do I wish to Confine my self to changing the ~~circuit~~ Line wire from one set of pens to the other set ~~by~~ Electrically as the pens instead of having the line disconnected from them may be lifted off the paper. (4e) when one set is doing work the other set is lifted off the paper & vice versa The lifting may be Controlled by an ~~Electromag~~ magnet actuated by waves sent from the distant or transmitting Station neither do I wish to Confine myself to using two sets of pens as one pen may be used which may be shifted sideways four or more times ~~the~~ the top part of any letter being transmitted first then the pen shifted by the mechanism of the receiving machine & the next portion of the Letter sent & recorded Then the Third & last The forth when the receiving pen is replaced by the mechanism in its original position ready to mark the next letter the time of shifting to mark being Controlled by the Magnet = figure 3. Shows The recording instrument,

a solution of compased of ~~the following ingredient~~, a saturated solution of Sulphuret of potash to which is added when sensativeness is required a slight amount of Hydrochloric Acid =
~~A~~ A saturated solution of Nitrate of Manganese – or a saturated solution of Prussiate of potash to which is added an equal amount of Nitrate of Ammonia ~~and~~ + the whole diluted with water.

I do not wish to confine my to recording with ink and having the ink absorb the metallic filings as the paper may be ~~Embossed~~ indented ~~and the~~ by an ordinary Morse Register and the indentations passing through the filing box be filled with the metal + then ~~incidentally~~ passed between the roller and forced into the paper + at the same time smoothing down the indentations and leaving a smooth metallic surface =
Neither do I wish to confine myself to any particular mode of transmitting these metallic characters as two contact springs close together one Connected

to one end of the line and one to the other. and in passing over the metallic character the circuit would be closed through it, or the metallic character might be forced through the paper so as to be on both sides and a contact spring rubbing on one side and connected to the line and the metallic drum underneath on which the paper runs might be connected to the other end of the line and the connection made through the paper = ~~I will mention here that the metalized characters may be~~

I claim = preparing telegraphic paper for automatic transmitting by recording by ink or indentations ~~and~~ substantially as described and metalizing the characters By forcing it ~~it~~ into the paper -

2 The rolls --- for the purpose set forth =

3 The Combination of the forcing & smoothing rolls or their Equivalents with the recording machine &c and metallic dust,

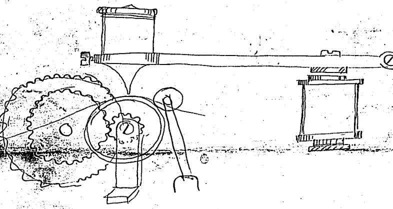
4
The transmitting rollers &c a device described or equivalent to transmitting from paper having metalized characters

5

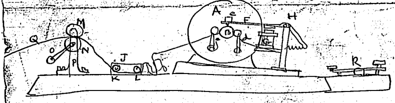
The chemical solutions substantially as set forth =

The object of this invention is to transmit with extreme rapidity by means of prepared paper telegraphic messages to a distant station = and recording the telegraphic characters upon Chemically prepared paper or by any suitable recording apparatus -

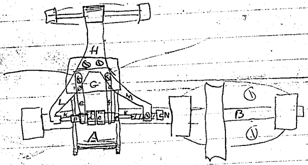
The invention consists in the manner of preparing the paper also in the mode of transmitting the characters over the wire, and the ingredients of the Chemical paper in Combination with the various apparatus =



To the ordinary Morse Recording or Embossing Machine is attach a fountain or reservoir of ink to the lever operated by the magnit



Copie


H
G
L
M
e
f
K
K
D
d
c
N
A
B

Caveat on The automatic System -
Transmitting &
Receiving Instruments,

The ~~general~~ object of this invention is ~~Consists in devices~~ for transmitting from The perforated paper and receiving ~~the~~ the chemically prepared paper, Expeditiously & accurately,

The invention consists in the several devices to accomplish that End as well as the arrangement of the Contact points & Electric Connections

figure 1 Shows one side of the Machine Which is the receiving part

The object of this invention is to transmit ~~and receive upon~~ Roman Characters by means of ~~pe~~ perforated paper or metallic types electric waves ~~of~~ over telegraphic circuits to form Roman Letters at the distant station, by means of a chemical recording instrument,

The invention consists in

First ~~a method~~ in the manner of grouping the various perforation on the transmitting slip and the arrangement of the battery and contact points or rollers,

Second in the arrangement at the receiving station of the recording points, compensating devices, and Electro Voltaic, corrector for correcting ~~the~~ any mutilation of the ~~signal~~ letter which takes place, also in a device for the prevention of false marks,

In figure one 1 is shown a method

2

set this mark we would get a
very sensation paper ;

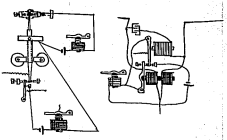
~~he~~ Have Sorrell push
Diamond Balloon thus through
he has it under way &
I have Model in show
Case have Murray Make
Model over — to him —

Get District Affadavit from
Gen'l & Air Sounder Etc,

for sending Shunts, use
[illegible] [illegible],

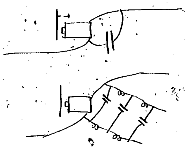
Lets go to work on Leonard
by Connecting Stalin
to Zeno & Balloon & having
Leonard & Balloon [illegible]
We get ~~the~~ a simple mark
which instantly fixes &
is more sensation than
Hidden Nut if we can

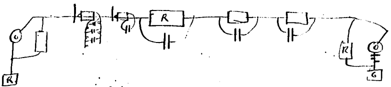
To be put in Patents

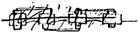


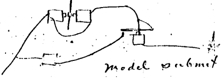
Model.

Sign English Pat
See Munn.
See Hermann Instrument
" if got all English patents
Go with M to Roosevelt

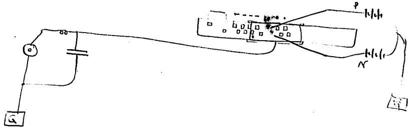


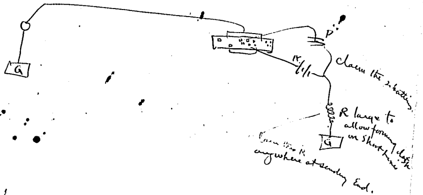




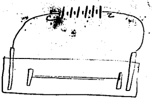


model submit to general

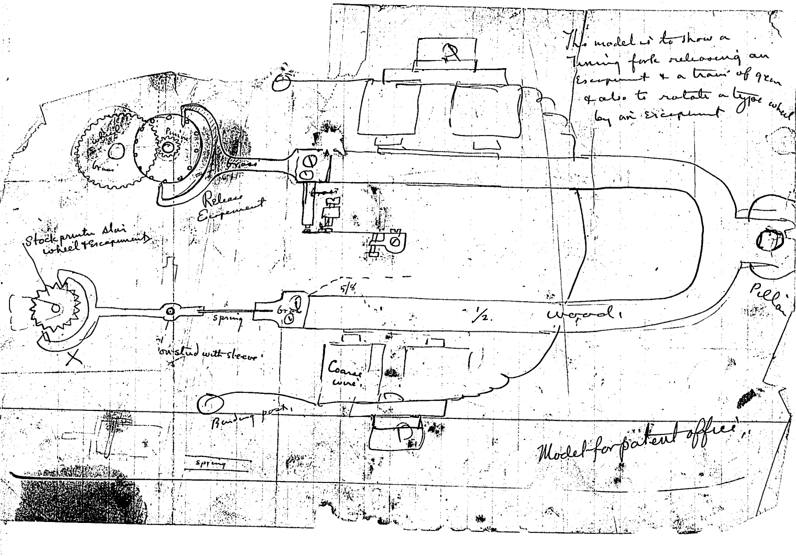



P
R
G
Claim the 2 batteries
R large to allow forming dots on Short line
Claim this R anywhere at sending End.

Claim ~~the~~ Combination of a Wheatstone Transmitting ~~auto~~ perford paper inst ~~orange~~ with Chemically prepared paper for recording the reversed Currents,



T A Edison
private papers
and drawings


wheel
Brass
Pinion
Brass
Release Escapement
Brass
Stock printer star wheel & Escapement
spring
Brass
5/8
1/2.
Wood,
Pillar
on stud with sleeve.
Coarse wire,
Binding post,
spring

This model is to show a Tuning fork releasing an Escapement & a train of gear & also to rotate a type wheel by an Escapement

Model for patent office",

[TRACING]

Tried shunting line before it came
to the forks with shunt to earth,
with polarized relays & reversed
currents - found that it ~~didnt~~
worked all four OK on Phila &
return but we did not attempt
to transmit from the receiving
station as the relay at transmitting
end shewed great return charge
found that magnets worked
with shunt to earth at both
ends did not appear to improve
the working had about 6 to
800 ohms in Each = we tried
the 1600 ohm old Dup Relay
at rec End & a 130 Cam Well
relay at transmitting End
We are now trying with 90
Cells Carbon 60 small & 30 = 1½
Gritting Common 130 ohm WU Rely

[TRACING]

With 3 ending condensers at one end & 1 at other put it in 3000 ohm didn't work very well perhaps magnet not well adjusted on reeds — put Albany on (ve) Menlo to Albany & return found trouble on wire — Either from cross fire ~~look~~ induction or a dead cross

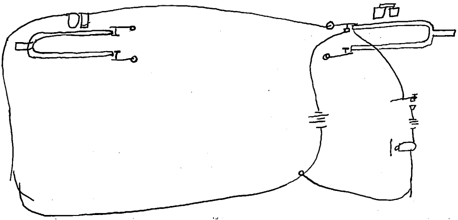
Find that the Condensers do not appear to discharge quick enough and a portion goes over into the next instrument ~~which~~ the Condenser is also retarded by the addition of the line charge hence it looks like a failure but perhaps a reverse current sent into the wire through the fork Earth wires or perhaps the insertion of a Condenser

[TRACING]

will prevent this,
I think short sharp reverse currents
from a battery is the most likely
to work,

Tried putting in smaller reverse
battery in fake Earth wires P to
line on one End Z on other didnt
do much if any good= tried
both with same poles to line this
appeard to weaken Condenser
Currents so Could cut signal
increased Condenser and then
Could signal but waves were
Carried over to other instrument,
Took batteries out of fake ground wire
and inserted Condenser in each
The idea being that Condenser
would receive charge ~~tak~~ from
[illegible] out in opposite direction
to next instrument or neutralize next

[TRACING]



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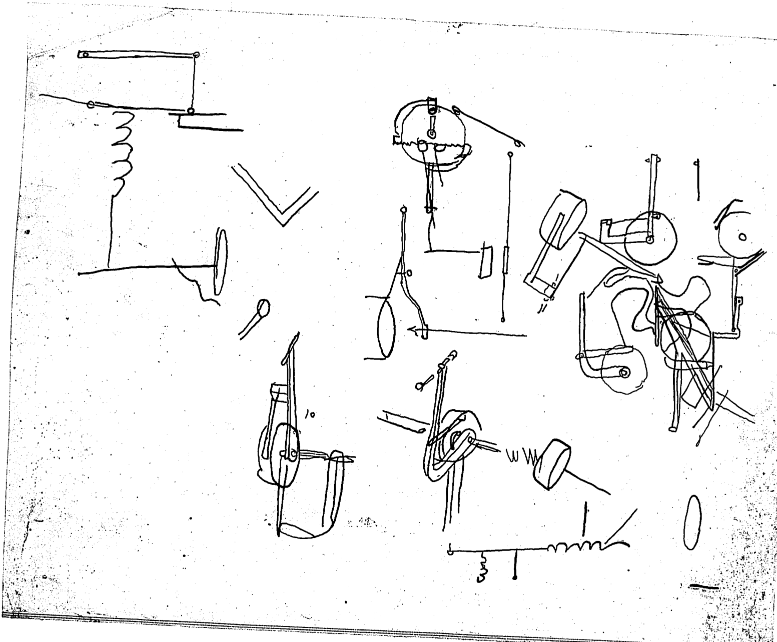

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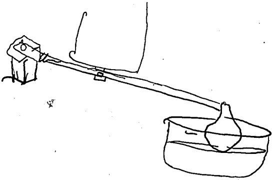

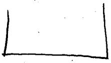

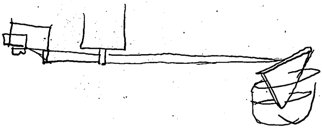

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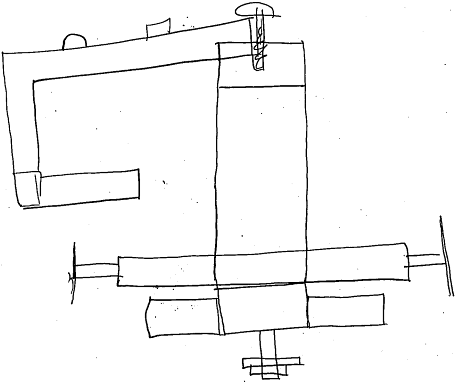

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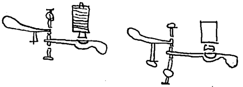

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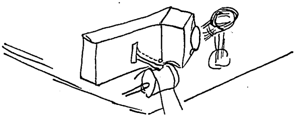
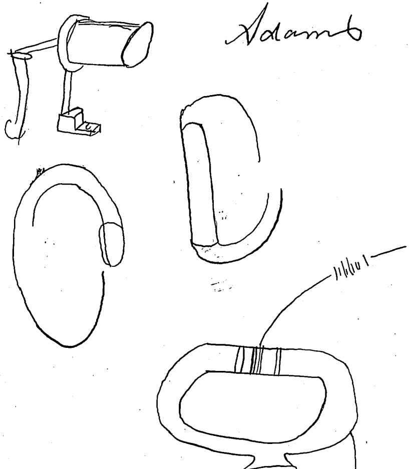


[TRACING]

Adams



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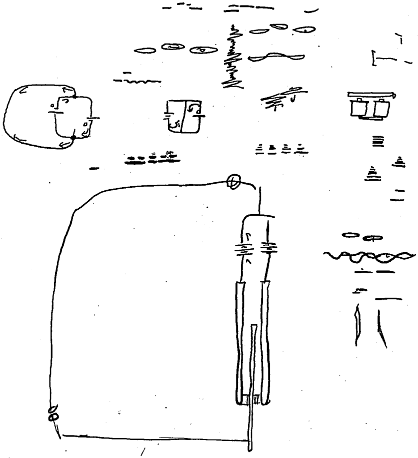
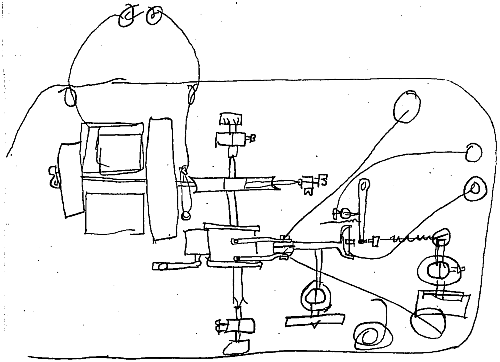
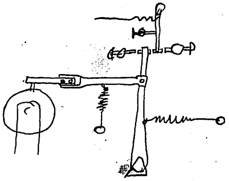


James Adams

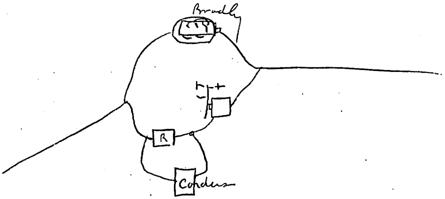
[TRACING]

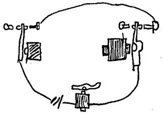


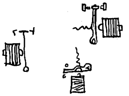


Emg

[TRACING]


Bradley
R
Condens





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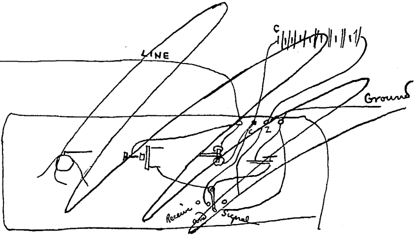
LINE
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and
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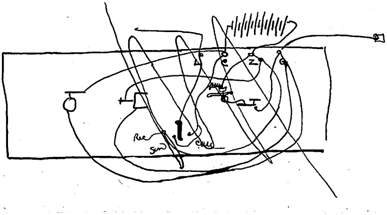
Z
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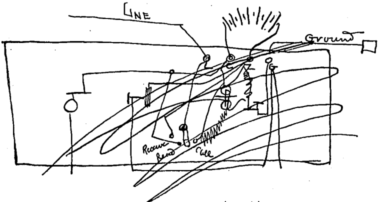
Snd
Call

[TRACING]


Line
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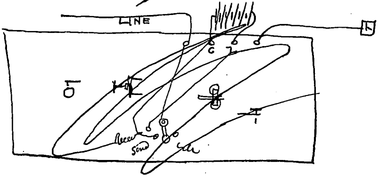
LINE
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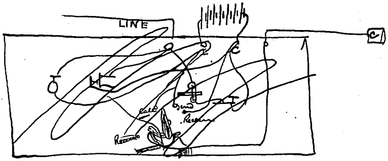
LINE
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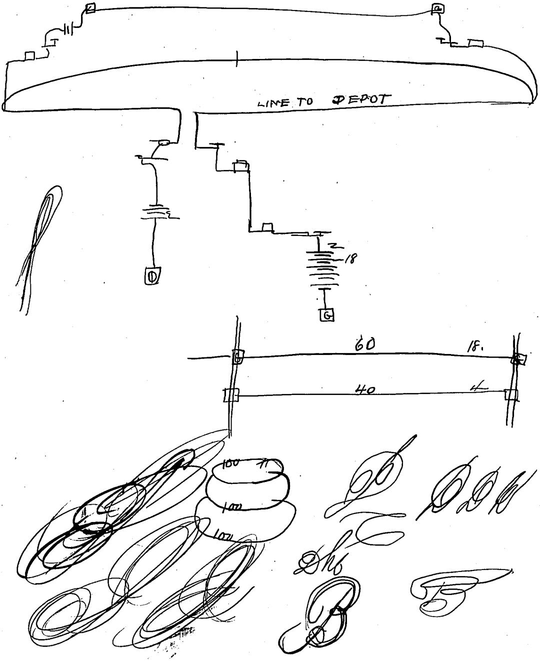
[TRACING]


LINE TO DEPOT
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18.
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4
100
71
100
100